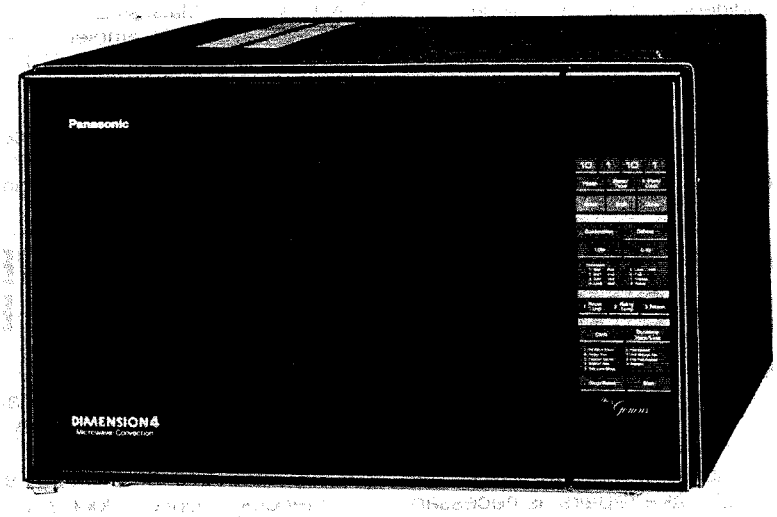
ORDER NO. CAD890801C60C1
E1

Service Manual

Microwave Oven

MODEL	U.S.A.	CANADA
	APH	CPH
NN-9509	○	—
NN-9809	○	○
NN-9859	○	○



Specifications

Power Source :	120 V AC Single Phase 60 Hz
Power Requirement :	Microwave : 1,400 W (12.2 A) Heater : 1,500 W (12.5 A)
Output :	Microwave : 700 W (Full Power) Heater : 1,400 W
Oscillation Frequency :	2,450 MHz
Timer :	99 min. 99 sec. / 9 hr. 99 min.
Outside Dimensions :	23-7/8" (W) × 18-7/8" (D) × 14-13/16" (H) 606 mm (W) × 481 mm (D) × 376 mm (H)
Oven Cavity Dimensions :	16-1/4" (W) × 16-13/16" (D) × 9-1/2" (H) 412 mm (W) × 426 mm (D) × 242 mm (H)
Weight :	NN-9509/NN-9809 APH·····53 lbs (24.1 kg) NN-9859 APH, NN-9809/NN-9859 CPH···59 lbs (26.9 kg)
Specifications subject to change without notice.	

Panasonic®

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WARNING

1. This product should be serviced only by trained qualified personnel.
2. Though this product has been manufactured in compliance with:
   "Federal Performance Standard 21 CFR Subchapter J" (D.H.H.S.): U.S.A. models
   or "Radiation Emitting Devices Act" (NHW): Canadian models
   it is very important all repairs should be made in accordance with procedures described in this manual to avoid being exposed to excessive microwave radiation.
3. Check for radiation leakage before and after every servicing according to the "procedure for measuring radiation leakage".
4. If the unit cannot be repaired on site, advise the customer not to use until unit be repaired.
5. Any serviceman who learns of any accident pertaining to microwave radiation leakage including the oven operating with open door should immediately notify the appropriate address listed below and Center for Devices and Radiological Health, DHHS.

IN U.S.A. (MSC)	Matsushita Services Company Division of Matsushita Electric Corporation of America 50 Meadowland Parkway, Secaucus, New Jersey 07094 Attention: Engineering Support Division. (201) 348-7000	IN PUERTO RICO (PSC)	PSC San Gabriel Industrial Park 65th Infantry Ave. Km.9.5 Carolina, Puerto Rico 00630 (809) 750-4300
		IN CANADA (MELCA)	Matsushita Electric of Canada Limited 5770 Ambler Drive, Mississauga, Ontario, L4W2T3 (416) 624-5010

6. There are special components used in the microwave oven which are important for safety. These parts are marked with a ⚠ on the replacement parts list. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent microwave leakage, shock, fire, or other hazards. Do not modify the original design.

PRECAUTIONS TO BE OBSERVED BEFORE AND DURING SERVICING TO AVOID POSSIBLE EXPOSURE TO EXCESSIVE MICROWAVE ENERGY

(A) Do not operate or allow the oven to be operated with the door open.

(B) Make the following safety checks on all ovens to be serviced before activating the magnetron or other microwave source, and make repairs as necessary:
   (1) Interlock operation
   (2) Proper door closing
   (3) Seal and sealing surfaces (arcing, wear, and other damage)
   (4) Damage to or loosening of hinges and latches.
   (5) Evidence of dropping or abuse

(C) Before turning on microwave power for any service test or inspection within the microwave generating compartments, check the magnetron, waveguide or transmission line, and cavity for proper alignment, integrity and connections.

(D) Any defective or misadjusted components in the interlock, monitor, door seal, and microwave generation and transmission systems shall be repaired, replaced, or adjusted by procedures described in this manual before the oven is released to the owner.

(E) A microwave leakage check to verify compliance with the Federal Performance Standard should be performed on each oven prior to release to the owner.

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FEATURE CHART (NN models)

MODEL / FEATURE	NN-9809, NN-9859	NN-9509
CYCLIC DEFROST	○	○
3-STAGE COOKING	○	○
AUTO SENSOR COOK	○	—
AUTO SENSOR REHEAT	○	—
AUTO WEIGHT DEFROST	○	○
AUTO REHEAT	—	○
AUTO WEIGHT COMBINATION	○	○
COMBINATION (TIME COOKING)	○	○
BAKING (AUTO PREHEATING)	○	○
BAKING (TIME COOKING)	○	○
BROILING (AUTO PREHEATING)	○	○
BROILING (TIME COOKING)	○	○
AUTO START	○	○
STAND/TIMER	○	○
MEMORY RECIPE (INCLUDES POPCORN)	—	○
DIGITAL CLOCK	○	○

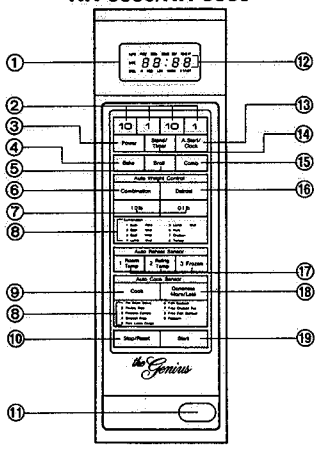
FEATURE CHART (MQ models)

MODEL / FEATURE	MQ8899W	MQ8869W
MULTI-STAGE DEFROST	○	○
3-STAGE COOKING	○	○
HUMIDITY SENSOR COOK	○	—
HUMIDITY SENSOR REHEAT	○	—
AUTOMATIC WEIGHT DEFROST	○	○
PROGRAMMED REHEAT	—	○
AUTOMATIC WEIGHT COMBINATION	○	○
COMBINATION (TIME COOKING)	○	○
CONVECTION (AUTO PREHEATING)	○	○
CONVECTION (TIME COOKING)	○	○
BROILING (AUTO PREHEATING)	○	○
BROILING (TIME COOKING)	○	○
AUTO START	○	○
TIMER/STAND	○	○
RECIPE MEMORY	○	○
DIGITAL CLOCK	○	○

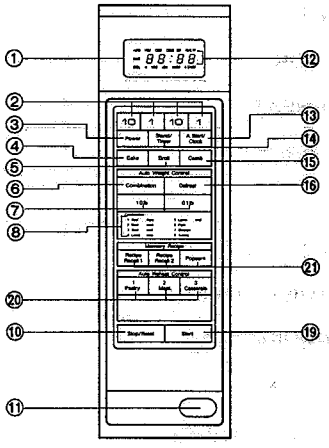
CONTROL PANEL

Control Panel

NN-9859/NN-9809



NN-9509

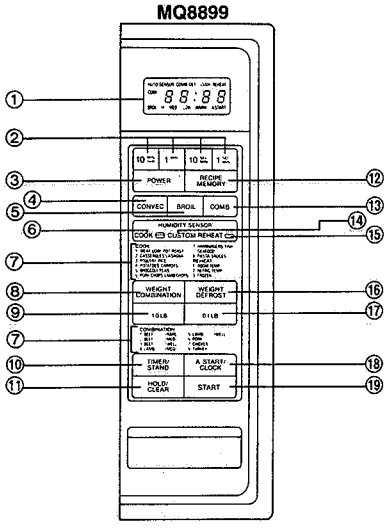


Controls with Auto Count-Up Feature*

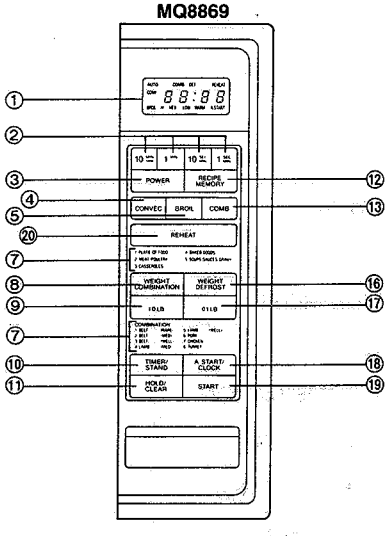
① Display Window
② Time Pads*
③ Power Pad*
④ Bake Pad*
⑤ Broil Pad
⑥ Auto Weight Combination Pad*
⑦ 1.0 lb/0.1 lb Pads*
⑧ Cooking Guide
⑨ Auto Sensor Cook Pad*
⑩ Stop/Reset Pad*
⑪ Door Release Button
⑫ Indicator Lights
⑬ A. Start/Clock Pad
⑭ Stand/Timer Pad
⑮ Combination Pad*
⑯ Auto Weight Defrost Pad
⑰ Auto Sensor Reheat Pads
⑱ Doneness Control Pad
More/Less Pad
⑲ Start Pad
⑳ Auto Reheat Control Pads*
㉑ Memory Recipe Pads
(including Popcorn Pad)

Control Panel

MQ8899



MQ8869



Controls with Auto Count-Up Feature*

① Display Window
② Time Pads*
③ Power Pad*
④ Convection Pad*
⑤ Broil Pad
⑥ Humidity Sensor Cook Pad*
⑦ Cooking Guide
⑧ Automatic Weight Combination Pad*
⑨ 1.0 Pound Pad*
⑩ Timer/Stand Pad
⑪ Hold/Clear Pad
⑫ Recipe Memory Pad
⑬ Combination Pad*
⑭ Custom Cook Pad
⑮ Humidity Sensor Reheat Pad*
⑯ Automatic Weight Defrost Pad
⑰ 0.1 Pound Pad*
⑱ A. Start/Clock Pad
⑲ Start Pad
⑳ Programmed Reheat Pad

OPERATION AND DIGITAL PROGRAMMER CIRCUIT TEST PROCEDURE

1. To Set Clock

OPERATION	DISPLAY
1. Plug the power supply cord into wall receptacle.	88:88
2. Tap [Clock] pad.	✳
3. Enter time of day (TOD) by tapping appropriate [number] pads.	11✳25
4. Tap [Clock] pad. TOD has now been registered into the digital programmer circuit and will count up by minutes.	11:25

2. Time Cooking For Two Stage

OPERATION	DISPLAY
1. Place a water load in the oven.	
2. Tap [Power] pad once for High power. (1st stage)	HIGH
3. Set for 5 seconds by tapping [Number] pad.	HIGH 5
4. Tap [Power] pad 3 times for Medium power. (2nd stage)	MED
5. Set for 10 seconds by tapping [Number] pad.	MED 10
6. Tap [Start] pad.	HIGH 5
7. When first stage cooking time has elapsed, oven automatically switches to 2nd stage cooking.	MED 10
8. When 2nd stage cooking time has elapsed, oven beeps 5 times and shuts off.	

3. Auto Weight Defrost (NN models)

OPERATION	DISPLAY
1. Tap [Auto Weight Defrost] Pad	AUTO DEF 0.0
2. Set the weight for 3 pounds by tapping [1.0] (lb) pad three times.	AUTO DEF 3.0
3. Tap [Start] Pad.	AUTO DEF 36 00
4. Tap [Stop/Reset] Pad twice Oven shuts off.	TOD reappears in the display window.

4. Automatic Weight Defrost (MQ models)

OPERATION	DISPLAY
1. Tap WEIGHT DEFROST Pad	AUTO DEF 0.0
2. Set the weight for 3 pounds by tapping 1.0 (LB) pad three times.	AUTO DEF 3.0
3. Tap START Pad.	AUTO DEF 36 00
4. Tap HOLD/CLEAR Pad twice Oven shuts off.	TOD reappears in the display window.

5. Auto Reheat (NN-9509)

OPERATION	DISPLAY
1. Tap Auto Reheat 1 Pad 4 times.	AUTO REHEAT 1 - 4
2. Tap Start Pad.	AUTO REHEAT 50
3. When cooking time has elapsed. • Oven beeps five times and shuts off.	• TOD reappears in the display window.

6. Programmed Reheat (MQ8869W)

OPERATION	DISPLAY
1. Tap REHEAT Pad 4 times.	REHEAT 4
2. Tap START Pad.	REHEAT 1 5
3. When cooking time has elapsed. • Oven beeps five times and shuts off.	• TOD reappears in the display window.

7. Auto Sensor Cooking (NN-9809, NN-9859)

NOTE: Make sure that the outer panel is installed before Auto Sensor Cooking Test, since Auto Sensor function does not operate properly without the outer panel.

OPERATION	DISPLAY
1. Pour 150 ± 15cc (4.5 ± 1/2 ozs) of room temperature water in a beaker, securely cover the top of the beaker with plastic wrap and place the beaker in the center of the oven.	COVER THE TOP OF THE BEAKER WITH PLASTIC WRAP
2. Tap Auto Sensor Cook Pad 6 times.	AUTO COOK 6
3. Tap Start Pad.	AUTO COOK 6
4. The humidity sensor detects steam about 2 to 5 minutes after the Start Pad is tapped. Auto Sensor Cooking (T1) automatically switches to time cooking (T2). "A6" disappears with beep sounds and the remainder of cooking time appears in display window. NOTE: Cooking time will vary depending on the water temperature, the shape of beaker or the power source voltage. NOTE: K factor for A6 program is 0.1.	AUTO COOK 9 AUTO COOK 27 NOTE: If 9 to 27 (9 seconds to 27 seconds) appears, AUTO SENSOR FUNCTION is normal.
5. When the balance of cooking time has elapsed, oven stops and beeps five times.	• TOD reappears in the display window.

8. Humidity Sensor Cooking (MQ8899W)

NOTE: Make sure that the outer panel is installed before Humidity Sensor Cooking Test, since Humidity Sensor function does not operate properly without the outer panel.

OPERATION	DISPLAY
1. Pour 150 ± 15cc (4.5 ± 1/2 ozs) of room temperature water in a beaker, securely cover the top of the beaker with plastic wrap and place the beaker in the center of the oven.	COVER THE TOP OF THE BEAKER WITH PLASTIC WRAP
2. Tap HUMIDITY SENSOR COOK Pad 8 times.	SENSOR COOK 8

OPERATION	DISPLAY
3. Tap START Pad.	SENSOR COOK 8
4. The humidity sensor detects steam about 2 to 5 minutes after the START Pad is tapped. Humidity Sensor Cooking (T1) automatically switches to time cooking (T2). "A8" disappears with beep sounds and the remainder of cooking time appears in display window. NOTE: Cooking time will vary depending on the water temperature, the shape of beaker or the power source voltage. NOTE: K factor for A8 program is 0.1.	SENSOR COOK 9 SENSOR COOK 27 NOTE: If 9 to 27 (9 seconds to 27 seconds) appears, AUTO SENSOR FUNCTION is normal.
5. When the balance of cooking time has elapsed, oven stops and beeps five times.	• TOD reappears in the display window.

9. Bake Cooking with Preheat (NN models)

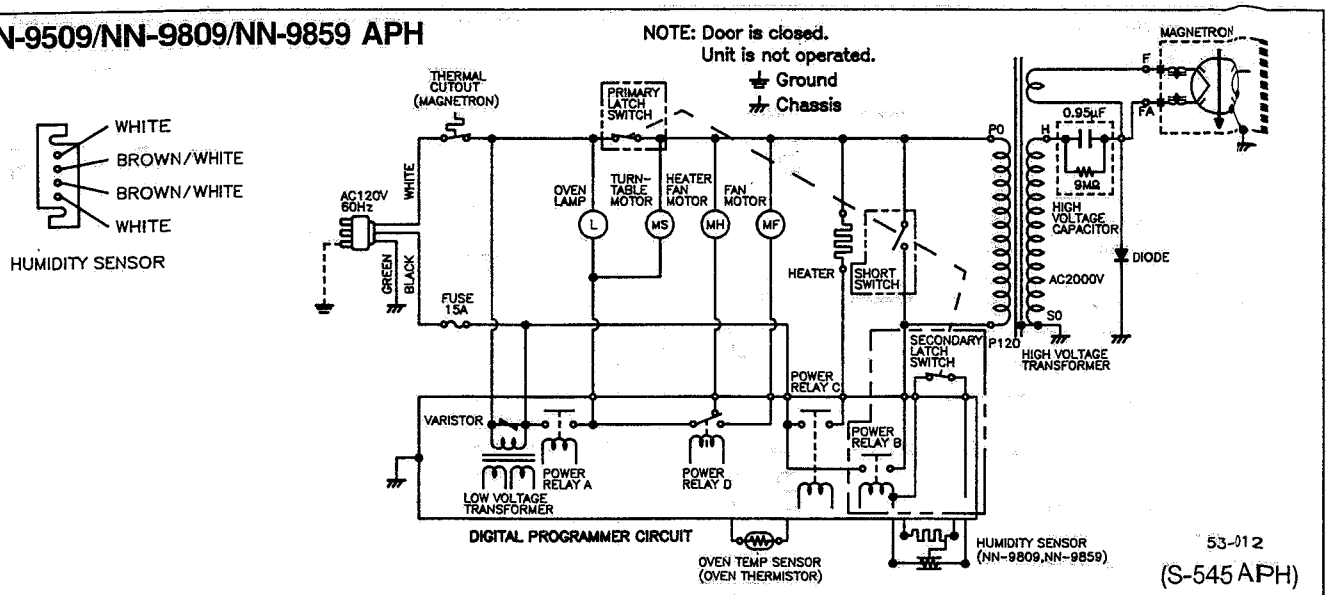
OPERATION	DISPLAY
1. Tap Bake pad twice.	BAKE 225F
2. Tap Start pad.	BAKE P
3. When preheating is completed, oven beeps 3 times. "P" begins to blink.	BAKE P
4. After completion of preheating, be sure to open the door.	BAKE P
5. Close the door and set bake cooking time for 2 minutes.	BAKE H 2
6. Tap Start pad.	BAKE 200

10. Convection Cooking with Preheat (MQ models)

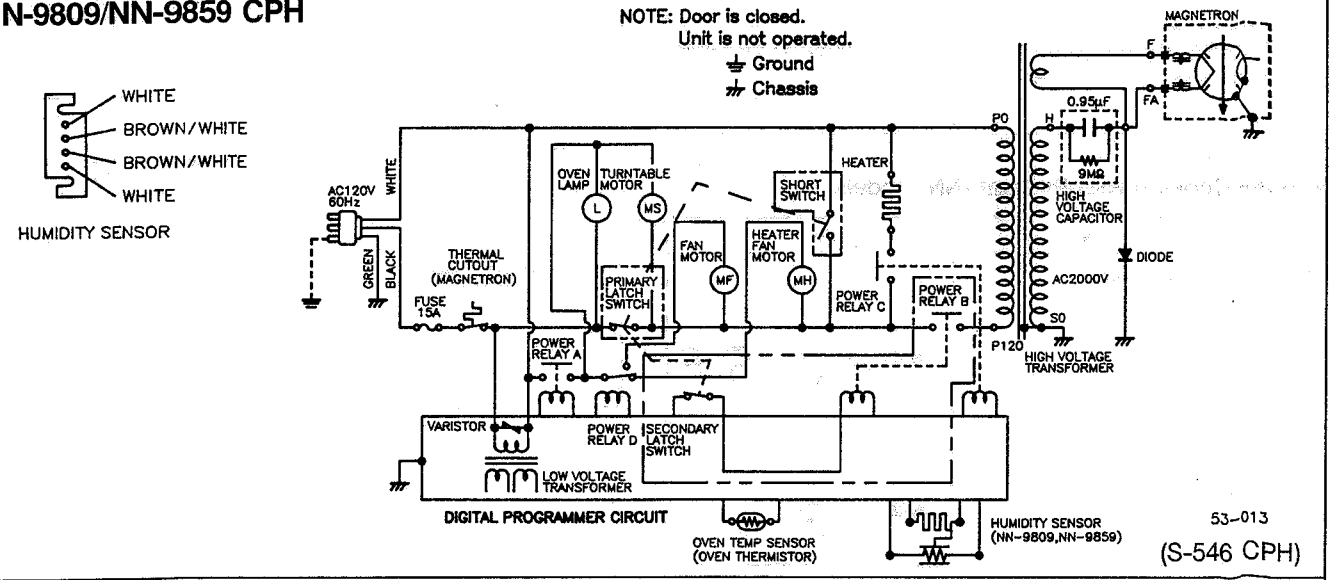
OPERATION	DISPLAY
1. Tap CONVEC pad twice.	CONV 225F
2. Tap START pad.	CONV P
3. When preheating is completed, oven beeps 3 times. "P" begins to blink.	CONV P
4. After completion of preheating, be sure to open the door.	CONV P
5. Close the door and set convection cooking time for 2 minutes.	CONV H 2
6. Tap START pad.	CONV 200

SCHEMATIC DIAGRAM

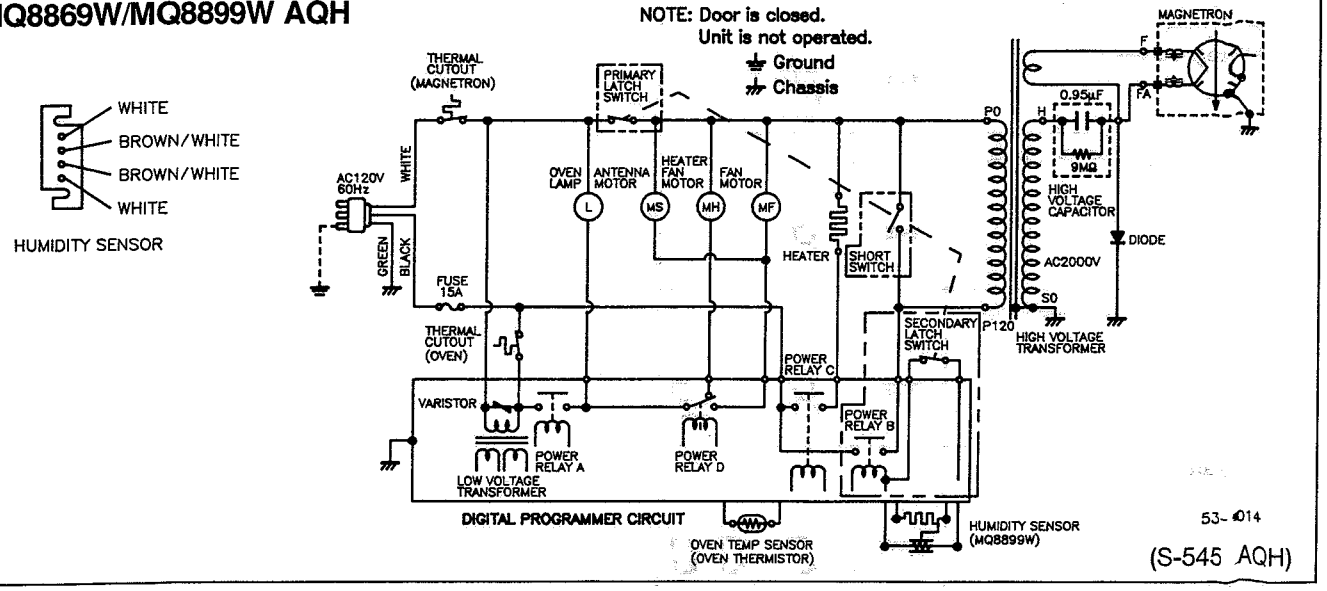
NN-9509/NN-9809/NN-9859 APH



NN-9809/NN-9859 CPH

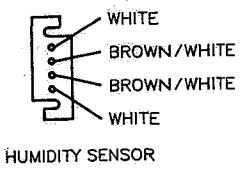


MQ8869W/MQ8899W AQH

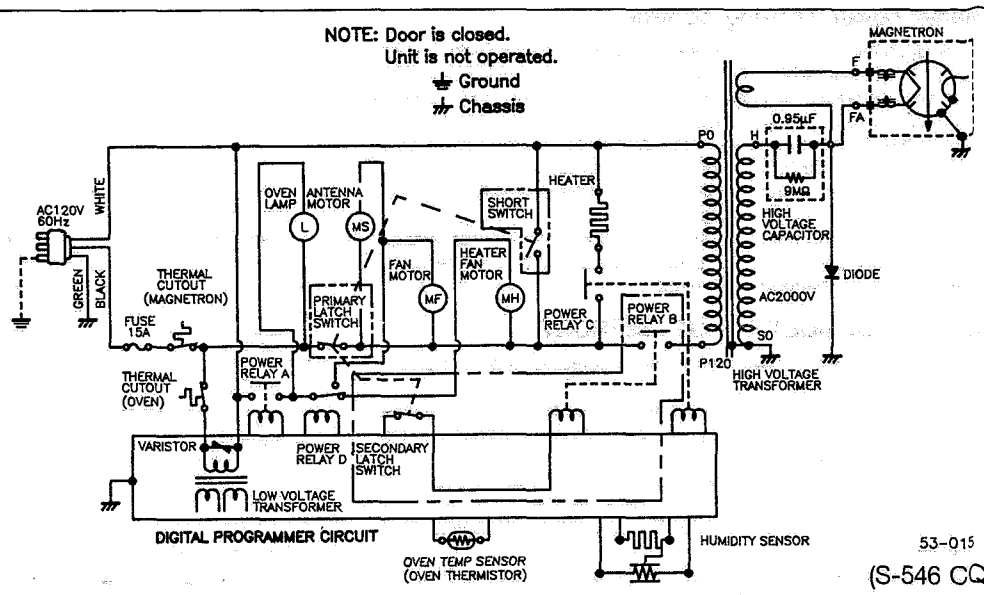


SCHEMATIC DIAGRAM

MQ8899W CQH

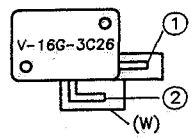
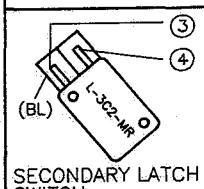
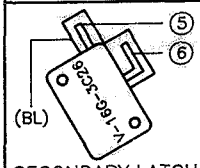
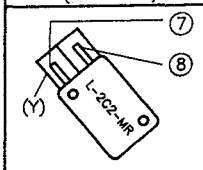


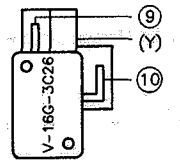
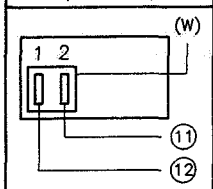
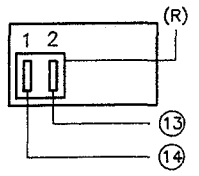
NOTE: Door is closed.
Unit is not operated.
⏚ Ground
⏚ Chassis



(S-546 CQH)

WIRING DIAGRAM

		APH	CPH	AQH	CQH
 PRIMARY LATCH SWITCH (TOP)	①	W/W/W	BR/B	W/W	B/BL
	②	W/W	B/B	W/W	B/B
 SECONDARY LATCH SWITCH (BOTTOM)	③	BL	BL	——	——
	④	BL	BL	——	——
 SECONDARY LATCH SWITCH (BOTTOM)	⑤	——	——	BL	BL
	⑥	——	——	BL	BL
 SHORT SWITCH (BOTTOM)	⑦	W/Y	Y/Y	——	——
	⑧	BL	GR/BL	——	——

		APH	CPH	AQH	CQH
 SHORT SWITCH (BOTTOM)	⑨	——	——	W/W	BL/W
	⑩	——	——	Y	B/B
 POWER RELAY B	⑪	BL/BL	BL	B/Y	GR
	⑫	B/B	B/GR	B/B	B/W
 POWER RELAY C	⑬	B	B	B	B
	⑭	——	——	——	——

NOTE: *When replacing, check the lead wire colour as shown.
*Colours shown by ( ) indicate colours of lead wire connector housing.

SYMBOL	COLOUR
OR	ORANGE
BL	BLUE
BR	BROWN
W	WHITE
Y	YELLOW
R	RED
GR	GRAY
B	BLACK

53-016

DESCRIPTION OF OPERATING SEQUENCE

1. Variable power cooking control

The coil of power relay B (RY2) is energized intermittently by the digital programmer circuit, when the oven is set at any power selection except for High power position. The digital programmer circuit controls the ON-OFF time of power relay B contacts in order to vary the output power of the microwave oven from "Warm" to "High" power. One complete ON and OFF cycle of power relay B is 22 seconds.
The relation between indications on the control panel and the output of the microwave oven is as shown in table.

NOTE: The ON/OFF time ratio does not correspond with the percentage of microwave power since approximately 2 seconds are required for heating of magnetron filament.

POWER SETTING	OUTPUT POWER(W) APPROX.	ON-OFF TIME OF POWER RELAY B (RY2)	
		ON(SEC)	OFF(SEC)
HIGH	700	22	0
MEDIUM	490	17	5
M.LOW	360	13	9
LOW	200	8	14
WARM	70	4	18
CYCLIC DEFROST	APPROX. 110W	Please refer to description of cyclic defrost	

2. Cyclic defrost/MULTI-STAGE DEFROST

When defrost power and defrosting time is selected and Start pad is touched:

(A) The digital programmer circuit (DPC) divides the total defrosting time into 8 equal periods, consisting of four defrosting periods, each followed by a standing period.

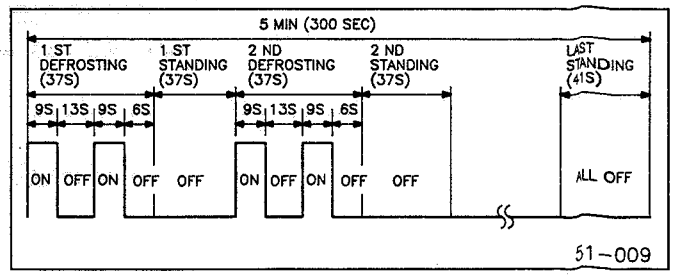
(B) During defrosting power periods, power relay B is energized for 9 seconds and de-energized for 13 seconds by DPC.

(C) During Standing periods, power relay B is always open resulting in no microwave power.

NOTE: Defrost time selected is converted into seconds by the DPC but display will show selected time in minutes and seconds as programmed. The total number of seconds is divided into 8 time periods. The remainder (seconds not equally divisible by 8) are added to the last standing time period.

Example: If Defrosting time is selected for 5 minutes, each operating period will be as follows :
5 minutes = 300 seconds
300/8 = 37 and remainder is 4 seconds.
The 4 seconds is added to the last time period.

NOTE: When defrosting time is selected for not more than 7 seconds, the power relay B will not be energized at all.



3. Auto/Automatic weight defrost, Auto/Programmed reheat control

When those Auto Control feature is selected and the Start Pad is tapped:

(A) The digital programmer circuit determines the power level and cooking time to complete cooking and indicates the operating state in the display window.
Table shows the corresponding cooking times for respective serving by categories.

(B) When cooking time in the display window has elapsed, the oven turns off automatically by a controll signal from the digital programmer circuit.

Auto/Automatic Weight Defrost

WEIGHT SELECTED	TOTAL DEFROSTING TIME
1 LB	12 min. 00 sec.
3 LB	36 min. 00 sec.

Auto Reheat (NN-9509)

CATEGORY / SERVING	1 Pastry	2 Meat	3 Casserole
1	15 sec.	1 min. 30 sec.	3 min. 30 sec.
4	50 sec.	4 min. 00 sec.	10 min. 30 sec.

Programmed Reheat (MQ8869W)

CATEGORY	COOKING TIME
1	3 min. 00 sec.
2	1 min. 30 sec.
4	15 sec.

4. Baking/Convection cooking control

The digital programmer circuit controls the ON-OFF time of the heater in order to control oven cavity temperature.

(A) After the start pad is tapped with the desired baking/convection program set, an 18V DC signal comes out of the digital programmer circuit and is applied to coil of power relay C (RY4).

(B) When the contacts of power relay C close, power source voltage (120V AC) is applied to the heater and the heater turns on.

(C) When the oven temperature reaches the set temperature, the digital programmer circuit senses the temperature through oven temp sensor and stops supplying an 18V DC signal to the coil of power relay C and the heater turns off.

(D) After the heater turns off, the oven temperature will continue increasing a while and then decrease as shown in Figure. When the oven temperature drops below the set temperature, the digital programmer circuit senses the signal and starts supplying an 18V DC signal to the coil of power relay again.

NOTE: When Broil feature is selected, oven temperature is determined automatically as shown in Figure.

5. Combination cooking control

Combination cooking is accomplished by microwave and baking-/convection cooking being done alternately during one combination cooking cycle. One combination cooking cycle is 22 seconds.

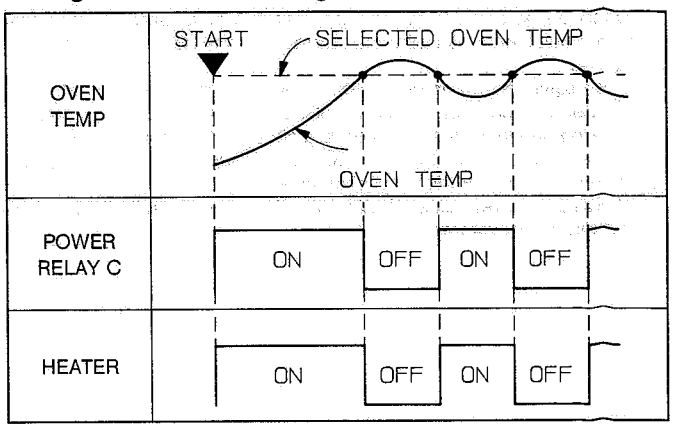
(A) During combination cooking, the digital programmer circuit controls ON-OFF time of both power relay B and C as shown in Figure.

(B) When the power relay B (RY2) is turned on, heater turns off and after the power relay B turns off, power relay C turns on.

NOTE 1: Note that the heater may not be on during a heater on period if the preprogrammed oven temperature has been reached. This is due to the fact that the oven is keeping the preprogrammed oven temperature constant, so of course the heater will only be on when it is needed and off when it is not needed.

NOTE 2: As for temperatures of combination cooking for convection, the temperatures by each program are preprogrammed in the microprocessor as shown in Figure.

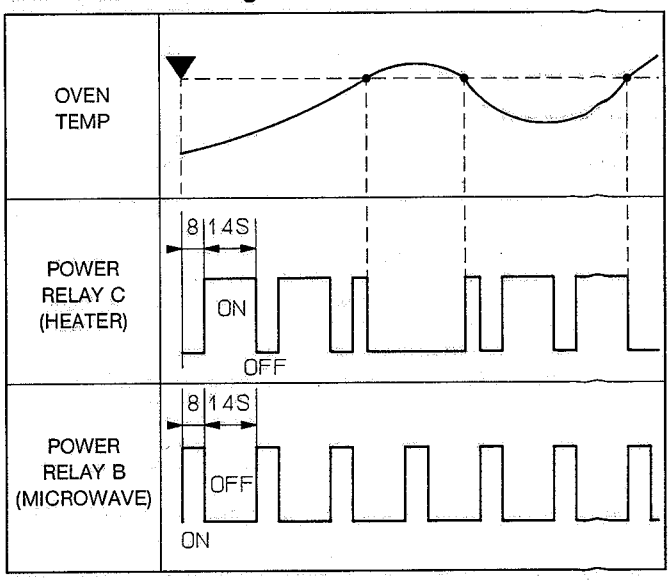
Baking/Convection Cooking



Broil Cooking

CATEGORY	OVEN TEMP
2	450°F

Combination Cooking



Combination Cooking

CATEGORY	MICROWAVE	HEATER	OVEN TEMP
1	8/22 SEC	14/22 SEC	275°F
2	8/22 SEC	14/22 SEC	300°F
3	8/22 SEC	14/22 SEC	325°
4	8/22 SEC	14/22 SEC	375°F

6. Auto/Automatic weight combination cooking control

When the Auto/Automatic Weight Control, Combination Cooking feature is selected by tapping the appropriate key pads and Start pad is tapped.

(A) The digital programmer circuit determines the power level, oven temperature and combination cooking time to complete combination cooking and indicates the operating state in the display window. Table shows the combination cooking times for respective weights.

(B) When the combination cooking time in the display window has elapsed, the oven turns off automatically by the controlled signal from the digital programmer circuit.

(NN models)

WEIGHT SELECTED	TOTAL COMBINATION COOKING TIME			
	CATEGORY 1	CATEGORY 3	CATEGORY 5	CATEGORY 8
1 LB	17 min. 00 sec.	24 min. 00 sec.	24 min. 00 sec.	17 min. 20 sec.
3 LB	51 min. 00 sec.	1 hour 12 min.	1 hour 12 min.	52 min. 00 sec.
5 LB	1 hour 25 min.	2 hours 00 min.	—	1 hour 26 min.
12 LB	—	—	—	3 hours 12 min.

(MQ models)

WEIGHT SELECTED	TOTAL COMBINATION COOKING TIME			
	CATEGORY 1	CATEGORY 3	CATEGORY 6	CATEGORY 8
1 LB	18 min. 00 sec.	30 min. 00 sec.	24 min. 00 sec.	19 min. 00 sec.
3 LB	54 min. 00 sec.	1 hour 30 min.	1 hour 12 min.	57 min. 00 sec.
5 LB	1 hour 30 min.	2 hours 30 min.	—	1 hour 35 min.
12 LB	—	—	—	3 hours 12 min.

7. Auto/Humidity sensor cooking (NN-9809, NN-9859, MQ8899W)

Auto/Humidity sensor cooking is a revolutionary way to cook by microwave without setting a power level or selecting a time.
All that is necessary is to select an Auto/Humidity sensor Program before starting to cook.

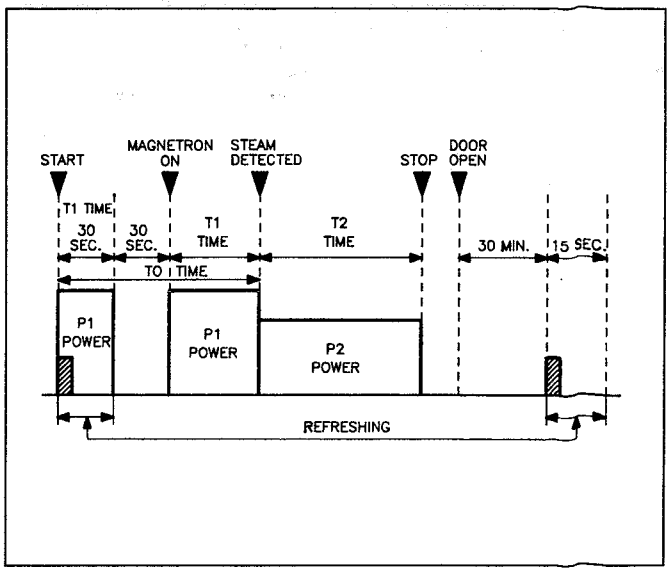
Understanding of Cooking

As food cooks, a certain amount of steam is produced. If the food is covered, this steam builds up and eventually escapes from the container. In Auto/Humidity Sensor Cooking, a carefully designed instrument, called the humidity sensor element, senses this escape of steam. Then, based upon the Auto/Humidity Sensor Program selected, the unit will automatically determine the correct power level and the proper length of time it will take to cook the food.

NOTE: Auto/Humidity Sensor Cooking is successful with the foods and recipes found in the Auto/Humidity Sensor Cooking Guide. Because of the vast differences in food composition, items not mentioned in the Cooking Guide should be prepared in the microwave oven using power select and time features. Please consult Variable Power Microwave Cookbook for procedures.

Explanation of the Auto/Humidity Sensor Cooking process

1) The shaded columns in Figure indicate when the humidity sensor heater is on.
2) During the 30 second period there is no microwave activity. When calculating the T2 time by using the formula below, make sure this 30 seconds is subtracted from the T0 time.
3) T1 time·····The total amount of time it takes the microwave oven. During this time one of the Auto/Humidity sensor programs will be shown in display.
4) T2 time·····When the steam escapes from the cooking container placed in the oven, the humidity sensor detects it and the microprocessor calculates the balance of cooking time. This T2 time is then shown in the display and begins counting down.



Balance of cooking time (T2 time)

The balance of cooking time which is called T2 time, can be calculated by the following formula.

T2 time (in sec.) =T1 time × K factor

NOTE: Remember, the T1 time starts after the Start pad is tapped. The coefficient K is programmed into the microprocessor memory and they are listed in the following tables along with the P1 and P2 powers.

NOTE: When "More" or "Less" pad is selected, the K factor varies resulting in T2 time to be increased or decreased.···**NN-9809, NN-9859**

NOTE: When CUSTOM COOK pad is selected, the K factor varies resulting in an increased or decreased T2 time.···**MQ8899W**

Example of calculating the T2 time

Example 1: If the T1 time is measured to be 2 minutes and 40 seconds, and the Auto/Humidity Sensor program selected is COOK 1

T2 = T1 × K
= 2 min. and 40 sec. × 2.5
= 160 sec. × 2.5
= 400 sec.
= 6 min. 40 sec.

8. Auto/Humidity sensor reheat (NN-9809, NN-9859, MQ8899W)

With Auto/Humidity sensor reheat, you can accurately reheat foods in accordance with their current state of preparation. This allows you to set the oven to reheat either: 1) Room temperature foods, 2) Refrigerated foods and 3) Frozen foods at their appropriate power levels and times. Best of all, Auto Sensor automatically does it all at the touch of a button!

NOTE: The Auto/Humidity sensor reheat, process is same as process.

Auto Sensor Cook (NN-9809, NN-9859)

	P1 Power	P2 Power	K factor Standard
A1	MED	M.LOW	2.5
A8	MED	LOW	0.3

Humidity Sensor Cook (MQ8899W)

	P1 Power	P2 Power	K factor Standard
A1	HIGH	M.LOW	2.5
A8	HIGH	WARM	0.1

Auto Sensor Reheat (NN-9809, NN-9859)

Category	P1 Power	P2 Power	K factor
1. Room Temp Foods	HIGH	MED	0.8

Humidity Sensor Reheat (MQ8899W)

Category	P1 Power	P2 Power	K factor
1. Room Temp Foods	HIGH	MED	0.8

CAUTIONS TO BE OBSERVED WHEN TROUBLESHOOTING

Unlike many other appliances, the microwave oven is high-voltage, high-current equipment. Though it is free from danger in ordinary use, extreme care should be taken during repair.

CAUTION

Servicemen should remove their watches whenever working close to or replacing the magnetron.

1. Check the grounding

Do not operate on a 2-wire extension cord. The microwave oven is designed to be used when grounded. It is imperative, therefore, to make sure it is grounded properly before beginning repair work.

2. Warning about the electric charge in the high voltage capacitor

For about 30 seconds after the oven is turned off, an electric charge remains in the high voltage capacitor.
When replacing or checking parts, remove the power plug from the outlet and short the terminal of the high voltage capacitor (terminal of lead wire from diode) to chassis ground with an insulated handle screwdriver or insulated jumper lead wire to discharge.

WARNING

There is high-voltage present, with high-current capabilities in the circuits of the high voltage winding and filament winding of the high voltage transformer. It is extremely dangerous to work on or near these circuits with oven energized.
DO NOT measure the voltage in the high voltage circuit including filament voltage of magnetron.

WARNING

Never touch any circuit wiring with your hand nor with an insulated tool during operation.

3. When parts must be replaced, remove the power plug from the outlet.

4. When the 15 Amp fuse is blown due to the operation of short switch:

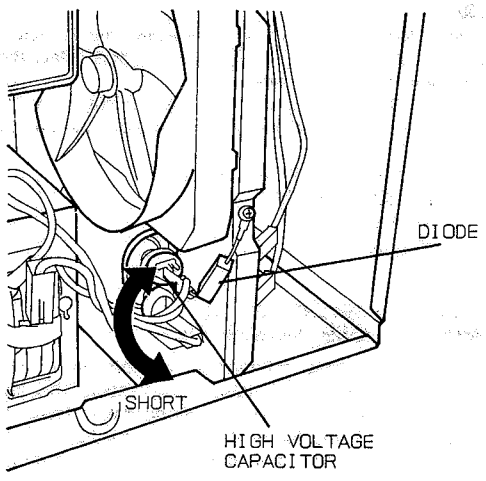
WARNING

When the 15 Amp. fuse is blown due to the operation of short switch, you must replace Primary latch switch and short switch. For U.S.A. models, also replace power relay B when the continuity check reads shorted contacts (1-2).

(A) This is mandatory. Refer to "Adjustments and Measurement" for these switches.
(B) When replacing the fuse, confirm that it has the appropriate rating for these models.
(C) When replacing faulty switches, be sure mounting tabs are not bent, broken or otherwise deficient in their ability to hold the switches.

5. Avoid inserting nails, wire, etc. through any holes in the unit during operation.

Never insert a wire, nail or any other metal object through the lamp holes on the cavity or any other holes or gaps, because such objects may work as an antenna and cause microwave leakage.



Touch chassis side first then short to the high voltage capacitor terminal.

6. Confirm after repair

(A) After repair or replacement of parts, make sure that the screws of the oven, etc. are neither loose nor missing.
Microwaves might leak if screws are not properly tightened.
(B) Make sure that all electrical connections are tight before inserting the plug into the wall outlet.
(C) Check for microwave energy leakage. (Refer to procedure for measuring microwave energy leakage).

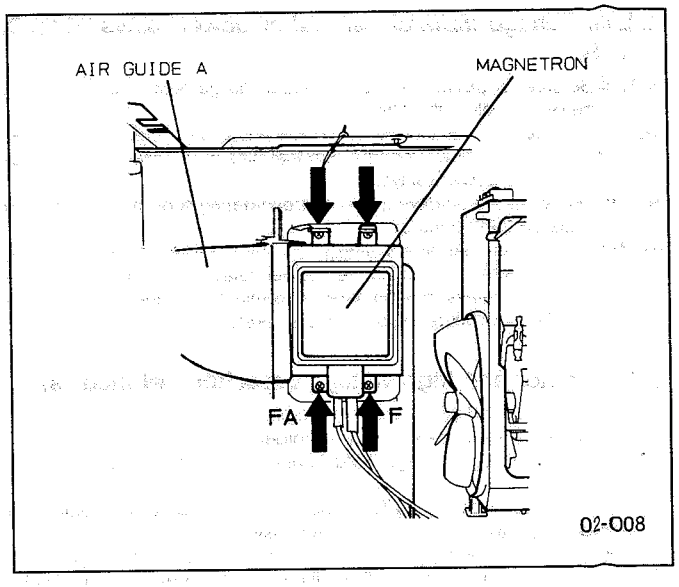
DISASSEMBLY AND PARTS REPLACEMENT PROCEDURE

1. Magnetron

(A) Discharge the high voltage capacitor.
(B) Remove 2 screws holding air guide A.
(C) Remove 1 screw holding air guide B. (MQ models)
(D) Disconnect 2 high voltage lead wires from magnetron filament terminals.
(E) Remove 4 screws holding the magnetron.
NOTE: After replacement of the magnetron, tighten mounting screws properly making sure there is no gap between the waveguide and the magnetron to prevent microwave leakage.

CAUTION
When replacing the magnetron, be sure the antenna gasket is in place.

CAUTION
When connecting 2 filament lead wires to the magnetron terminals, be sure to connect the lead wires in the correct position. The lead wire of high voltage transformer should be connected to "F terminal" and the lead wire from high voltage capacitor should be connected to "FA terminal".

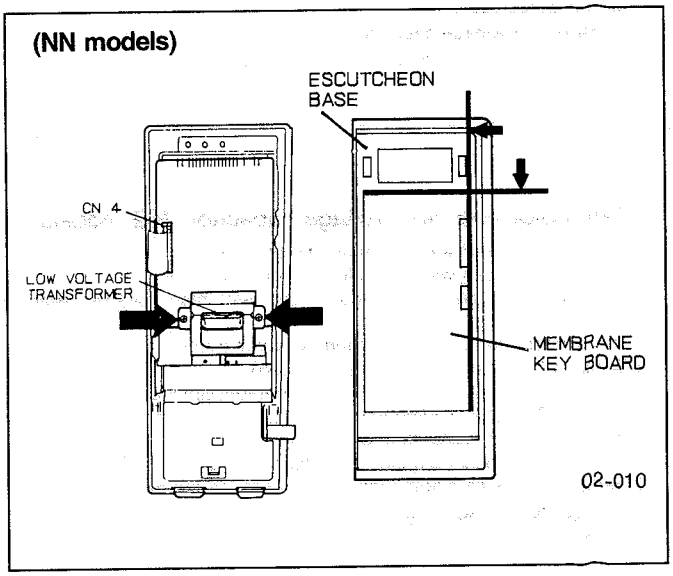


2. Digital programmer circuit (DPC) and membrane key board. (NN models)

NOTE: Be sure to ground any static electric charge built up on your body, before handling the DPC.
(A) Disconnect all connectors from D.P.C.
(B) Remove 1 screw holding escutcheon base and slide the escutcheon base upward slightly.
(C) Release CN4 connector's lock of DPC by pushing both levers to inside and pull them upward, and remove flat cable of membrane key board.
(D) Remove 2 screws holding DPC.

To replace membrane key board

(E) Remove escutcheon bracket from escutcheon base by freeing 4 catch hooks on the escutcheon base.
(F) Push the upper part of key board sheet (display window portion) from back of escutcheon base and peel key board sheet.
(G) Peel off membrane key board from escutcheon base.
NOTE: 1. The membrane key board is attached to the escutcheon base with double faced adhesive tape.
2. When installing new membrane key board, make sure that the surface of escutcheon base is cleaned sufficiently so that any problems (shorted contacts or uneven surface) can be avoided.

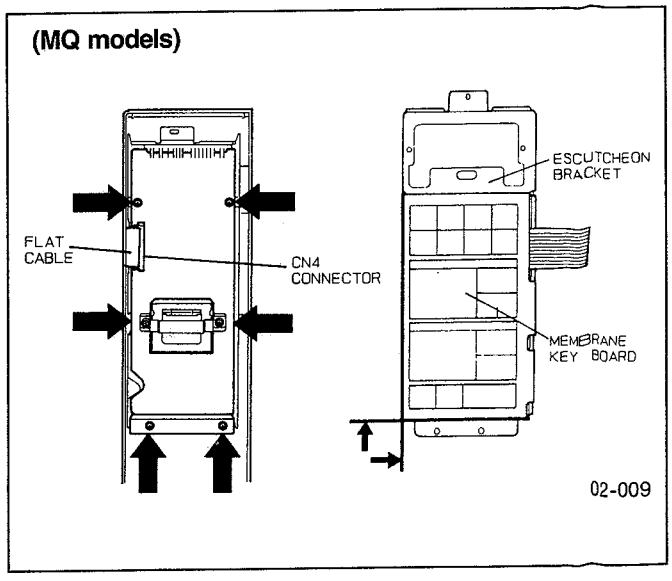


3. Digital programmer circuit (DPC) and membrane key board.(MQ models)

NOTE: Be sure to ground any static electric charge built up on your body, before handling the DPC.
(A) Disconnect all connectors from D.P.C.
(B) Remove 2 screw holding escutcheon base and slide the escutcheon base upward slightly.
(C) Release CN4 connector's lid and pull off the flat cable of the membrane key board.
(D) Remove 4 screws holding DPC.

To replace membrane key board

(E) Remove 2 screws holding escutcheon bracket to the escutcheon base.
(F) Peel off the membrane key board from the escutcheon bracket.
NOTE: 1. The membrane key board is attached to the escutcheon bracket with double faced adhesive tape.
2. When installing new membrane key board, make sure that the surface of escutcheon bracket is cleaned sufficiently so that any problems (shorted contacts or uneven surface) can be avoided.
3. Make sure that new membrane key board is aligned to the left and lower edges of the escutcheon bracket.



4. Low voltage transformer and/or power relays (RY1, 2, 4, 5)

NOTE: Be sure to ground any static electric charge built up on your body before handling the DPC.

(A) Using solder wick or a desoldering tool and 30W soldering iron, carefully remove all solder from the terminal pins of the low voltage transformer and/or power relays.

NOTE: Do not use a soldering iron or desoldering tool of more than 30 watts on DPC contacts.

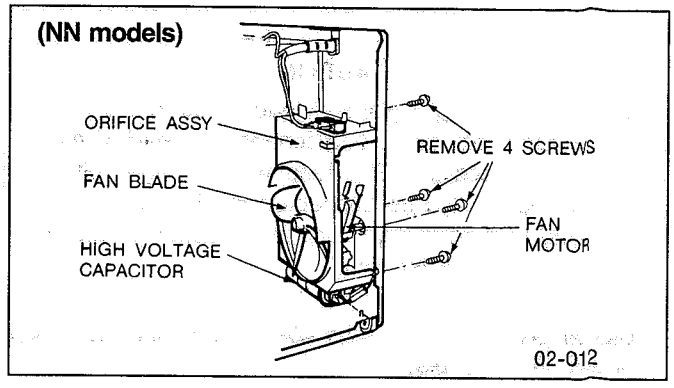
(B) With all the terminal pins cleaned and separated from DPC contacts, remove the defective transformer/power relays and install new transformer/power relays making sure all terminal pins are inserted completely. Resolder all terminal contacts carefully.

5. Fan motor and high voltage capacitor (NN models)

(A) Disconnect 2 lead wires from fan motor terminals.
(B) Disconnect 2 lead wires from fuse holder terminals.
(C) Disconnect 4 high voltage lead wires from high voltage capacitor terminals.
(D) Remove 4 screws holding fan motor and orifice assy and detach the orifice assy with fan motor from oven assy.
(E) Remove fan blade from the fan motor shaft by pulling it straight out.
(F) Separate the fan motor from the orifice assy by freeing 2 catch hooks on the orifice assy.

To replace high voltage capacitor

(G) Remove 1 screw holding high voltage capacitor

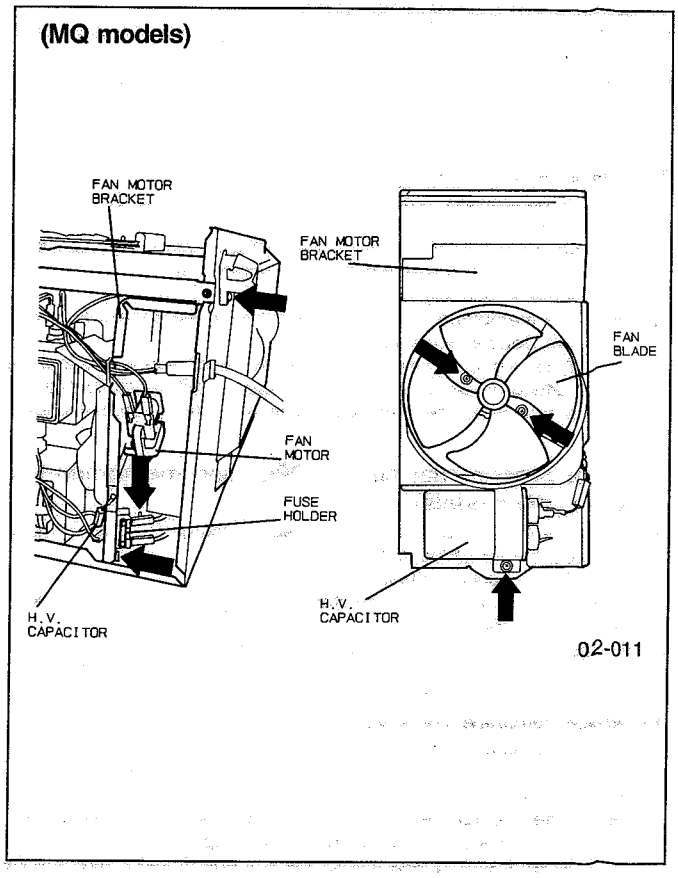


6. Fan motor and high voltage capacitor (MQ models)

(A) Disconnect 2 lead wires from fan motor terminals.
(B) Disconnect 2 lead wires from fuse holder terminals.
(C) Disconnect 4 high voltage lead wires from high voltage capacitor terminals.
(D) Disconnect 1 lead wire from thermal cutout terminal.
(E) Remove 1 screw from power supply cord.
(F) Remove 1 screw holding oven reinforcement bracket.
(G) Remove 3 screws holding fan motor bracket and detach the fan motor bracket with fan motor from oven assy.
(H) Remove fan blade from the fan motor shaft by pulling it straight out.
(I) Remove 2 screws holding the fan motor to the fan motor bracket.

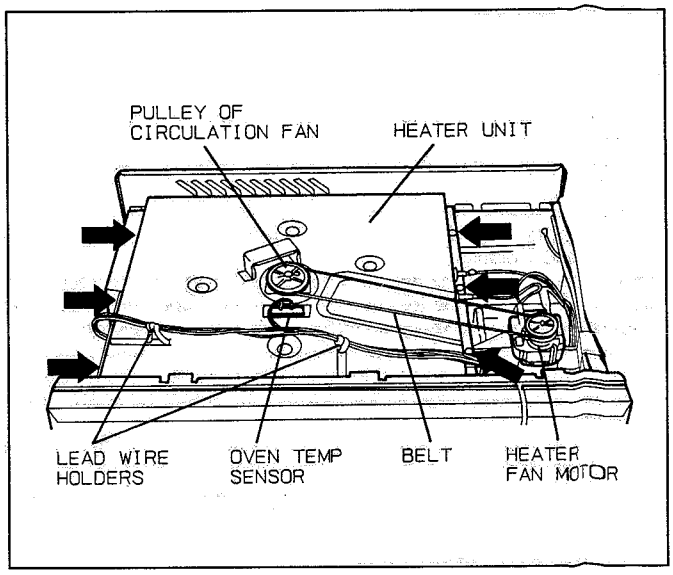
To replace high voltage capacitor

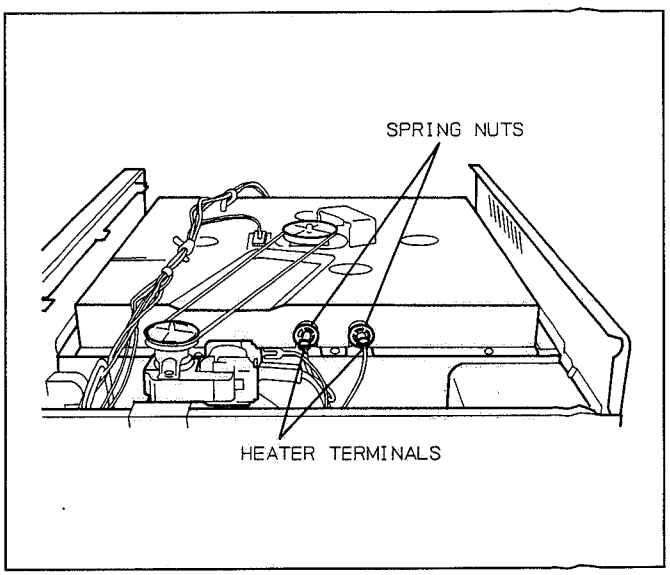
(J) Remove 1 screw holding high voltage capacitor.

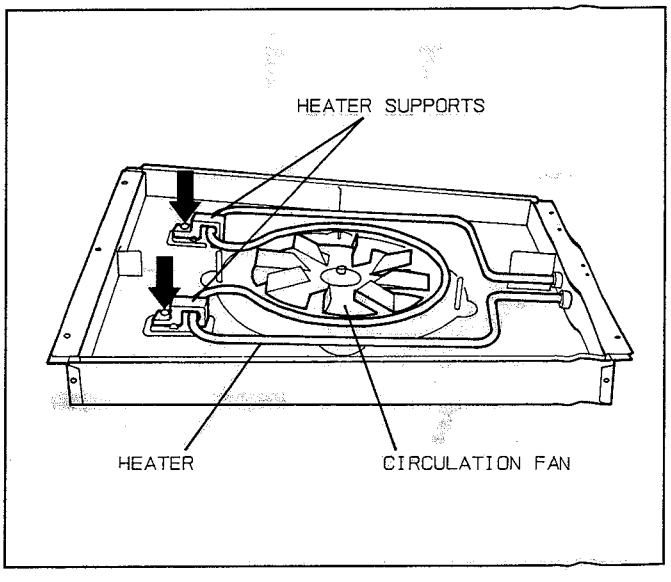


7. Heater

(A) Remove lead wires from lead wire holders.
(B) Remove belt from pulleys of circulation fan.
(C) Remove 2 screws holding oven temp sensor.
(D) Remove 2 lead wires from heater terminals by removing screws.
(E) Remove 4/6 screws holding the both sides of heater unit and lift it up carefully.
(F) Remove 2 spring nuts from heater terminals.
(G) Remove 2 screws holding heater supports and detach the heater.







8. Door assembly

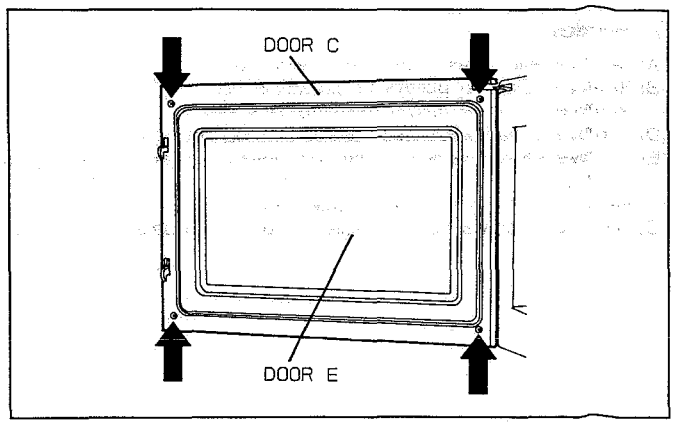
(A) Open the door and remove 4 screws holding door C.
(B) Remove the door C from door E by carefully pulling outward starting from upper right hand corner.
(C) Remove door key spring and remove 3 screws holding door handle. (MQ models)
(D) Separate the door A from the door E by freeing 8/6 catch hooks on the door A.
(E) Remove door key spring and door key. (NN models)
(F) Remove door keys, door key lever, door key spring and door key pins. (MQ models)

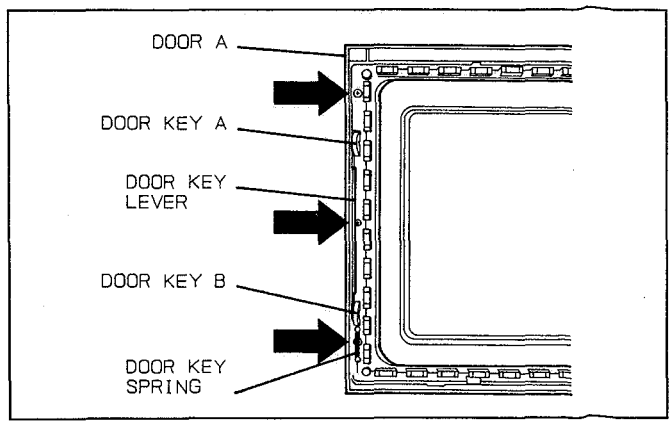
After replacement of the defective component parts of the door, reassemble it and follow the instructions below for proper installation and adjustment so as to prevent an excessive microwave leakage.

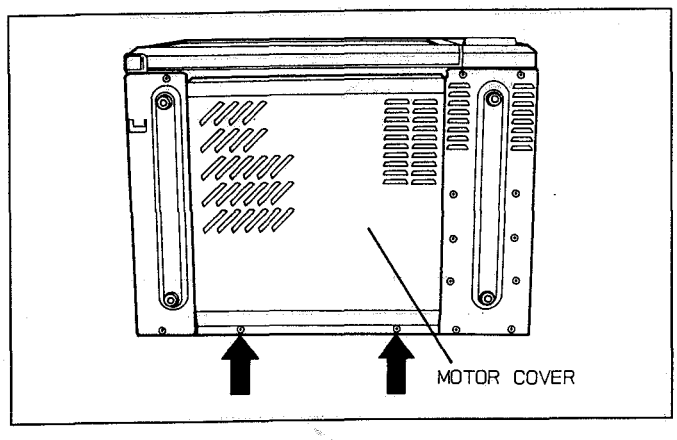
(1) When mounting the door to the oven, be sure to adjust the door parallel to the bottom line of the oven face plate by moving the upper hinge and lower hinge in the direction necessary for proper alignment.
(2) Adjust so that the door has no play between the inner door surface and oven front surface. If the door assembly is not mounted properly, microwave may leak from the clearance between the door and oven.
(3) Perform the microwave leakage test.

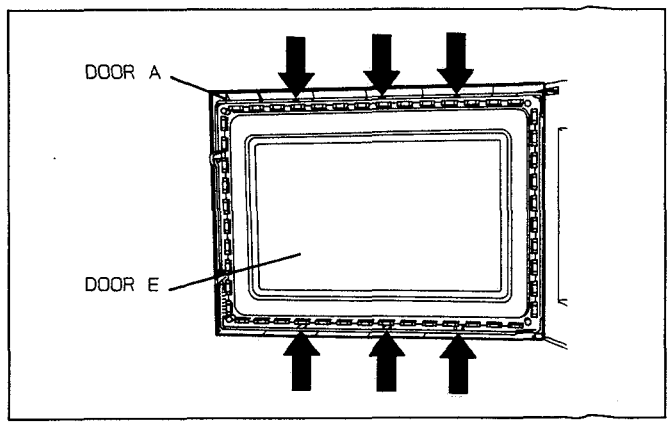
9. Turntable/Antenna motor

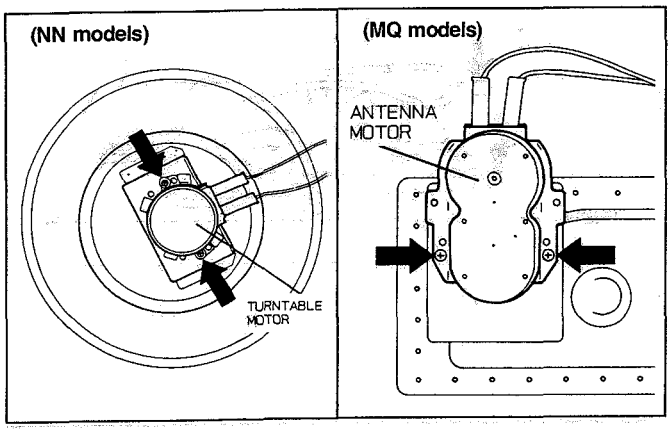
(A) Remove 2 screws holding motor cover.
(B) Disconnect 2 lead wires from turntable/antenna motor.
(C) Remove 2 screws holding turntable/antenna motor.

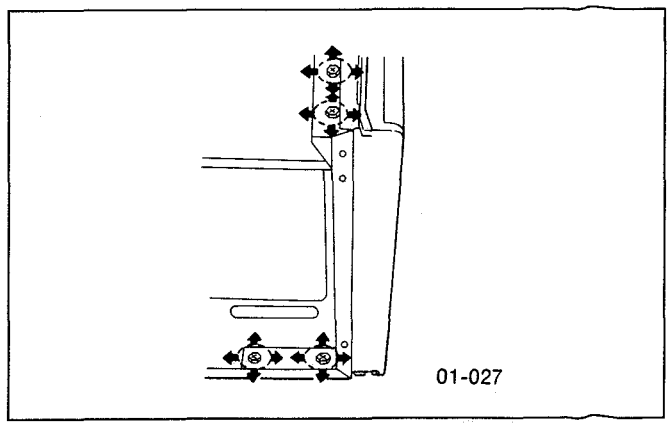












10. Floor shelf and/or moving antenna(MQ models)

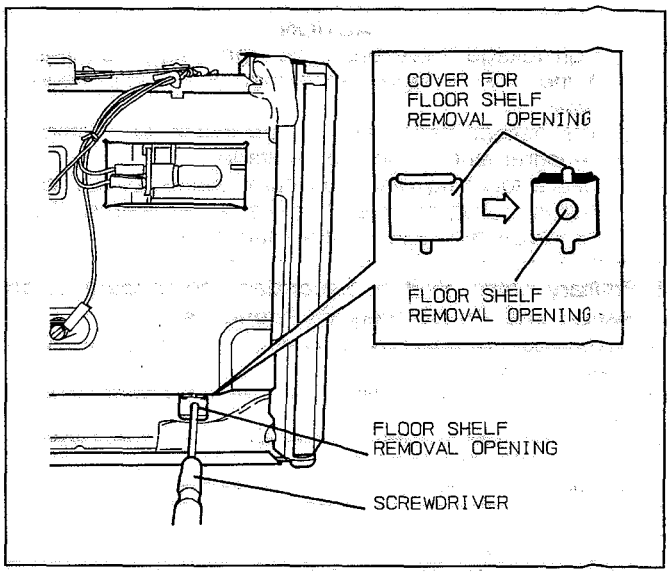
(A) Bend metal cover which covers the floor shelf removal opening located on left side oven wall and insert a phillips type screwdriver or equivalent approx.3" (7.5 cm) in shaft length in the hole.
(B) Carefully lift up the floor shelf by using the screwdriver until the floor shelf is lifted up over the level of oven opening front.
(C) Remove the floor shelf by lifting it up from oven front.

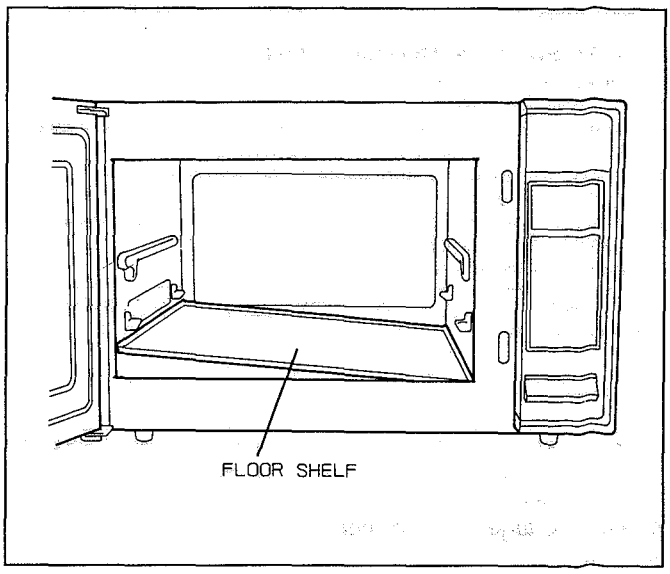
To replace the moving antenna.

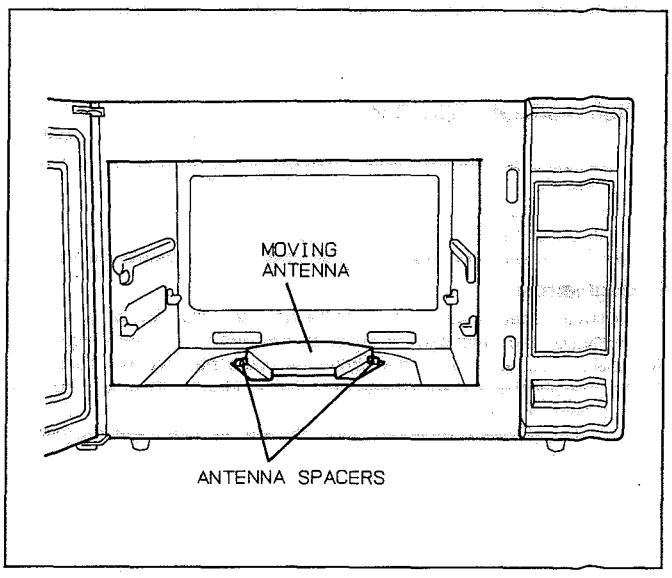
(D) Remove the moving antenna by simply lifting it up off the antenna motor shaft.

NOTE: When replacing the moving antenna, make sure the plastic antenna spacers are correctly in place.

(E) When installing floor shelf in position, make sure that front edge side of the floor shelf is inserted in position first then press down the rear side.







COMPONENT TEST PROCEDURE

CAUTION

1. High voltage is present at the high voltage terminal of the high voltage transformer during any cook cycle.
2. It is neither necessary nor advisable to attempt measurement of the high voltage.
3. Before touching any oven components, or wiring, always unplug the oven from its power source and discharge the high voltage capacitor.

1. Primary Latch Switch, Secondary (Secondary Latch Switch and Power relay B) Interlocks.

(A) Unplug lead connectors to Power Relay B and verify continuity of the power relay B 1-2 terminals.
(B) Unplug lead connectors to Primary Latch Switch and Secondary Latch Switch.
(C) Test the continuity of switches at door opened and closed positions with ohm meter (low scale).
Normal continuity readings should be as follows.

	Door Opened	Door Closed
Primary Latch Switch	∞ Ω (open)	0 Ω (close)
Secondary Latch Switch	∞ Ω (open)	0 Ω (close)
Power Relay B	∞ Ω (open)	∞ Ω (open)

2. Short Switch & Monitor Circuit

(A) Unplug lead wires from H.V. transformer primary terminals.
(B) For CPH/CQH only
make short circuit across the lead wires connected to power relay B (RY2) with temporary jumper wire for testing.
(C) Connect test probes of ohm meter to the disconnected leads which were connected to H.V. Transformer.
(D) Test the continuity of short switch with door opened and closed positions using lowest scale of the ohm meter.
Normal continuity readings should be as follows.

Models	Door closed	Door opened
Touch Models	∞ Ω	0 Ω
Mechanical Models	Some Ohm See Note	0 Ω

NOTE: In this case, the ohm meter indicates some resistance of the part(s) such as oven lamp, blower fan motor, etc. connected in parallel with the monitor circuit.

3. High voltage transformer

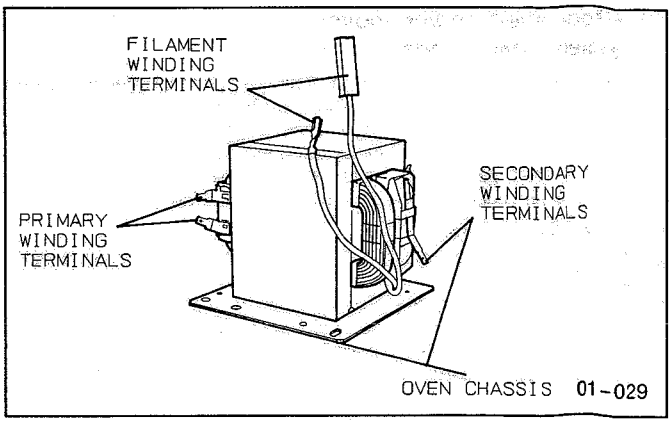
(A) Remove connections from the transformer terminals and check continuity.
(B) Normal (cold) resistance readings should be as follows:
Secondary winding ····· Approx. 80Ω~120Ω
Filament winding ····· Approx. 0Ω
Primary winding ····· Approx. 0Ω~ 1Ω

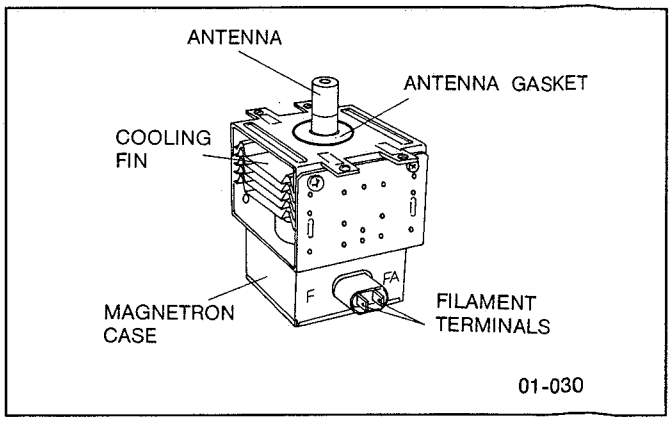
4. High voltage capacitor

(A) Check continuity of capacitor with meter on highest OHM scale.
(B) A normal capacitor will show continuity for a short time, and then indicate 9MΩ once the capacitor is charged.
(C) A shorted capacitor will show continuous continuity.
(D) An open capacitor will show constant 9MΩ.
(E) Resistance between each terminal and chassis should be infinite.

5. Magnetron

Continuity checks can only indicate an open filament or a shorted magnetron. To diagnose for an open filament or shorted magnetron.
(A) Isolate magnetron from the circuit by disconnecting the leads.
(B) A continuity check across magnetron filament terminals should indicate one ohm or less.
(C) A continuity check between each filament terminal and magnetron case should read open.





6. Diode

(A) Isolate the diode from the circuit by disconnecting the leads.
(B) With the ohmmeter set on the highest resistance scale, measure the resistance across the diode terminals. Reverse the meter leads and again observe the resistance reading. Meter with 6V, 9V or higher voltage batteries should be used to check the front-to-back resistance of the diode, otherwise an infinite resistance may be read in both directions.
A normal diode's resistance will be infinite in one direction and several hundred kΩ in the other direction.

7. Membrane key board (Membrane switch assembly)

Check continuity between switch terminals, by tapping an appropriate pad on the key board. The contacts assignment of the respective pads on the key board is as shown in digital programmer circuit.

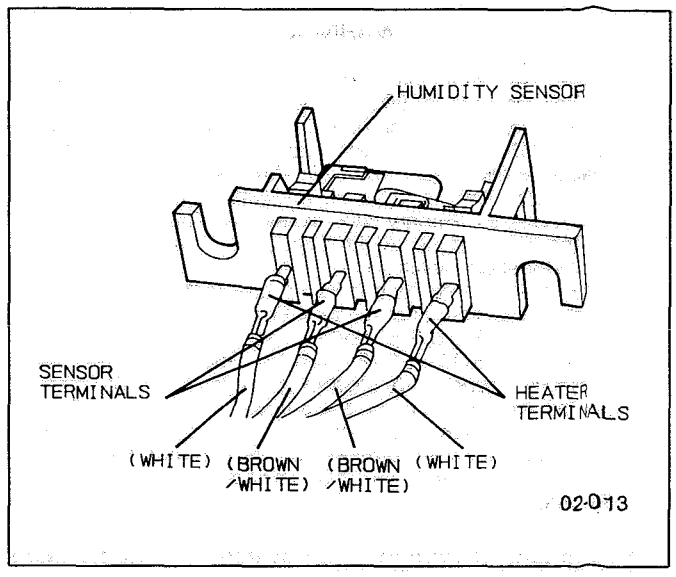
8. Humidity Sensor and digital programmer circuit

CAUTION
Do not touch any parts of the circuitry on the digital programmer circuit since static electric discharge may damage this control panel.
Always ground yourself while working on this panel to discharge any static charge built up on your body.

(A) Check across sensor heater terminals. Normal cold resistance should read approx. 4.5 ohm.
(B) In order to determine if the Auto/Humidity Sensor function of the digital programmer circuit is in working order or not, do the following test.
1) Place a water load in the oven.
2) Unsolder 2 brown/white wires connected to sensor terminals.
3) Tap Auto/Humidity Sensor COOK Pad 8 times to set auto/humidity sensor cooking at "8" and tap Start Pad.
4) About 10 seconds after Start Pad is touched, short 2 brown/white wires for 5 seconds and then remove them. Before shorting the 2 brown/white wires you can watch the sensor heater glow red.
5) Approx. 75 seconds after the Start Pad is pressed (T0 TIME), short the 2 brown/white wires again
6) "8" should disappear in display window and following digits (see chart) should appear indicating **balance of cooking time (T2 TIME). The time should start to count down and oven should shut off when the time has elapsed.

* T0 TIME	** T2 TIME (balance of cooking time)
70 sec.~79 sec.	12 sec. (NN-9809, NN-9859) 4 sec. (MQ8899W)
80 sec.~89 sec.	15 sec. (NN-9809, NN-9859) 5 sec. (MQ8899W)

The Auto Sensor function in the digital programmer circuit is working in order if above condition is obtained.



9. Oven temp sensor thermistor

This sensor monitors the heat produced by the heater circuit and maintains the oven temperature the user had selected.Normal room temperature, especially in a kitchen can vary anywhere from 50°F to 90°F. The reading across the oven sensor thermistor should be within 360K ohm to 800K ohm when reading in an area within the 50°F to 90°F room temperature range.
If the resistance reading is out of the range stated here, the sensor is detective and must be replaced.

NOTE 1: When measuring resistance disconnect the 4-pin connector(CN3) from the DPC otherwise a false reading may be indicated.
2: If checking an oven sensor thermistor just after the microwave oven has been operating, the sensor of course won't be room temperature. In this case the sensor must be removed and allowed to cool down to the 50°F to 90°F range.

MEASUREMENTS AND ADJUSTMENTS

WARNING

* For continued protection against radiation hazard, replace only with identical replacement parts (For NN models Part No. ANE61424L0AG, Type No. V-16G-3C26 for Primary latch switch Part No. A61424650AP, Type No. L-3C2-MR for Secondary latch switch and Part No. ANE6178-5R0, Type No. L-2C2-MR for short switch. For MQ models Part No. ANE61424L0AG, Type No. V-16G-3C26 for Primary latch switch and Secondary latch switch and Part No. ANE61784L0AG, Type No. V-16G-2C25 for short switch.)
* When the 15 Amp. fuse is blown due to the operation of short switch, you must replace Primary latch switch and short switch. For U.S.A. models, also replace power relay B (Part No. AEG5J1EG12, Type No. G5J-1-TP) when the continuity check reads shorted contacts (1—2). Then follow the adjustment procedures below.
* Interlock switch replacement — In replacing faulty switches, be sure mounting tabs are not bent, broken or otherwise deficient in their ability to hold the switches.
* Refer to schematic diagram to ensure proper connection.

1. Adjustment of Primary latch switch, Secondary latch switch and short switch

(A) When mounting Primary latch switch, Secondary latch switch and short switch to door hook assembly, mount the Primary latch switch, the Secondary latch switch and the short switch to the door hook assembly as shown in table.

NOTE: No specific adjustment during installation of Primary latch switch, Secondary latch switch and short switch to the door hook is necessary.

(B) When mounting the door hook assembly to the oven assembly, adjust the door hook assembly by moving it in the direction of arrow in table so that the oven door will not have any play in it. Check for play in the door by pulling the door assembly. Make sure that the latch keys move smoothly after adjustment is completed. Completely tighten the screws holding the door hook assembly to the oven assembly.

(C) Reconnect the short switch and check the continuity of the monitor circuit and all latch switches again by following the components test procedures.

2. Measurement of microwave output

The power output of the magnetron can be determined by performing a simple water heating test as described below.

Necessary Equipment:

*Two 1 liter beakers *Glass thermometer

*Wrist watch or stopwatch

NOTE: Check the line voltage under load. Low voltage will lower the magnetron output. Take the temperature readings and heating time as accurate as possible.

(A) Fill each beaker with exactly one liter of tap water. Stir the water using the thermometer and record each beaker's temperature (recorded as T1A and T1B).

(B) Place both beakers on the center of metal tray/shelf.
Set the oven for High power and heat it for exactly two minutes.

(C) Stir the water again and read the temperature of each beaker (recorded as T2A and T2B).

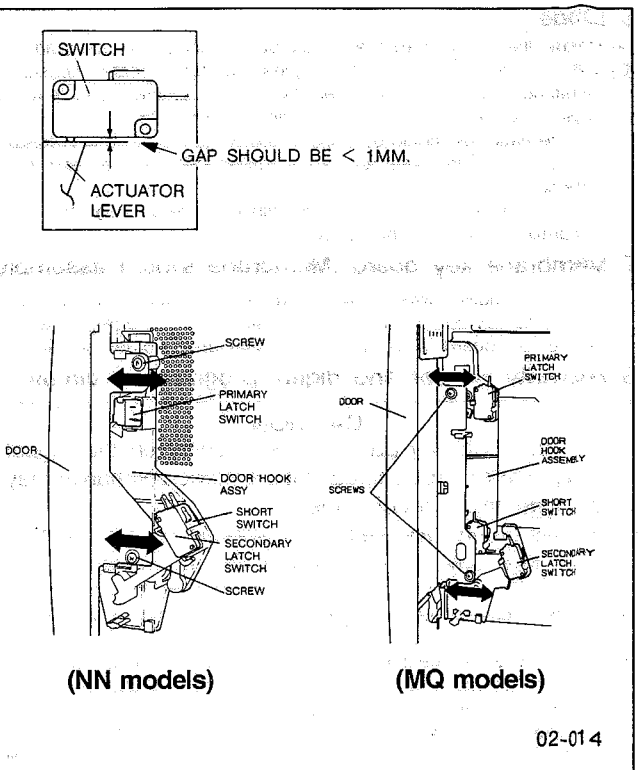
(D) Obtain the temperature rise by using the following formula:

$$\text{Average temperature rise} = \frac{(T2A + T2B) - (T1A + T1B)}{2}$$

(E) The normal temperature rise at High power position for each models is as shown in table A.

(F) To obtain the power output, multiply the average temperature rise by 39 (or 70 if thermometer is in Celsius).
Example:
If you find average temperature rise of 18°F the ovens output is $18 \times 39 = 702$ watts.

NOTE: This test may be conducted by heating one liter of water for one minute if only one beaker is available. In this instance you will find the temperature rise being smaller than the above specifications due to the microwave absorption characteristic. You may judge the magnetron to be normal when the temperature rise is greater than temperature rise shown in table B.



(NN models) **(MQ models)**

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Please confirm that the gap between the switch housing and switch actuator levers is no more than 1.0mm when the door is closed.

TABLE A (2 ℓ -2min. test)

RATED OUTPUT	TEMPERATURE RISE
500W	11.5—14.7°F (6.4—8.2°C)
600W	13.8—17.8°F (7.7—9.9°C)
700W	16.0—20.0°F (8.9—11°C)

TABLE B (1 ℓ -1min. test)

RATED OUTPUT	TEMPERATURE RISE
500W	Min. 9.7°F (5.4°C)
600W	Min. 11.5°F (6.5°C)
700W	Min. 13.5°F (7.5°C)

PROCEDURE FOR MEASURING MICROWAVE ENERGY LEAKAGE

WARNING

Check for radiation leakage after every servicing. Should the leakage be more than 2 mW/cm² (1mW/cm² for Canada) inform the MSC, PSC, or MELCA immediately. After repairing or replacing any radiation safety device, keep a written record for future reference, as required by D.H.H.S and NHW regulation. This required must be strictly observed. In addition, the leakage reading must be recorded on the service repair ticket while in the customer's home.

NOTE: The U.S. government standard is 5 mW/cm² while in the customer's home. 2mW/cm² stated here is our own voluntary standard. (1mW/cm² for Canada)

1. Equipment

*Electromagnetic radiation monitor
*Glass thermometer 212°F or 100°C
*600cc glass beaker

2. Procedure for measuring radiation leakage.

Note before measuring

(1) Do not exceed meter full scale deflection. Leakage monitor should initially be set to the highest scale.

(2) To prevent false readings the test probe should be held by the grip portion of the handle only and moved along the shaded area shown in ***Figure*** *no faster than 1 inch/sec (2.5 cm/sec)*

(3) Leakage with the outer panel removed·····less than 5mW/cm²

(4) Leakage for a fully assembled oven with door normally closed····· less than 2mW/cm² (1mW/cm² for Canada)

(5) Leakage for a fully assembled oven [Before the latch switch (primary) is interrupted] while pulling the door ·····less than 2mW/cm²

(A) Pour 275 ± 15cc (9ozs ± 1/2oz) of 20 ±5°C (68 ± 9°F) water in a beaker which is graduated to 600cc, and place the beaker in the center of the oven.

(B) Set the radiation monitor to 2450MHz and use it following the manufacturer's recommended test procedure to assure correct results.

(C) When measuring the leakage, always use the 2 inch (5cm) spacer supplied with the probe.

(D) Tap the start pad with the magnetron oscillating, measure the leakage by holding the probe perpendicular to the surface being measured.

(1) Measurement with the outer panel removed.

Whenever you replace the magnetron, measure for radiation leakage before the outer panel is installed and after all necessary components are replaced or adjusted. Special care should be taken in measuring around the magnetron.

WARNING

Avoid contacting any high voltage parts.

(2) Measurements with a fully assembled oven.

After all components, including the outer panel are fully assembled, measure for radiation leakage around the door periphery, the door viewing window, the exhaust opening and air inlet openings.

3. Record keeping and notification after measurement

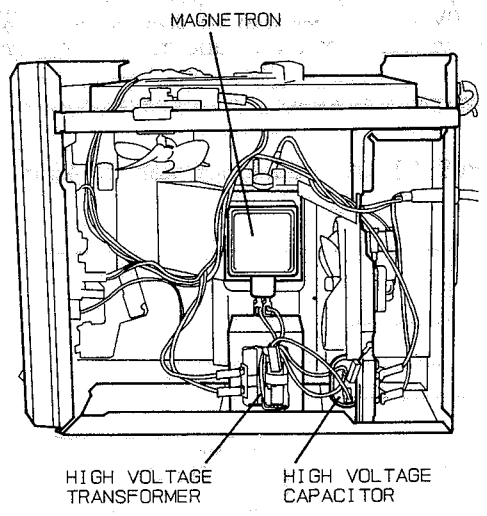
(A) After any adjustment or repair to a microwave oven, a leakage reading must be taken. Record this leakage reading on the repair ticket even if it is zero.
A copy of this repair ticket and the microwave leakage reading should be kept by repair facility.

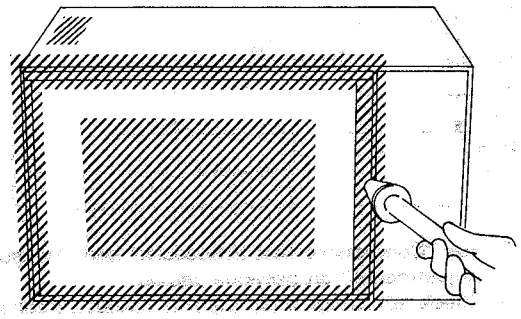
(B) Should the radiation leakage be more than 2 mW/cm² (1mW/cm² for Canada) after determining that all parts are in good condition, functioning properly, and genuine replacement parts as listed in this manual have been used, immediately notify the MSC, PSC or MELCA

4. At least once a year, have the radiation monitor checked for calibration by its manufacturer.

WARNING

AVOID CONTACTING ANY HIGH VOLTAGE PARTS.





MOVE PROBE ALONG SHADED AREA (////) AROUND EXHAUST OPENINGS (as shown) AND AROUND AIR INLET OPENING

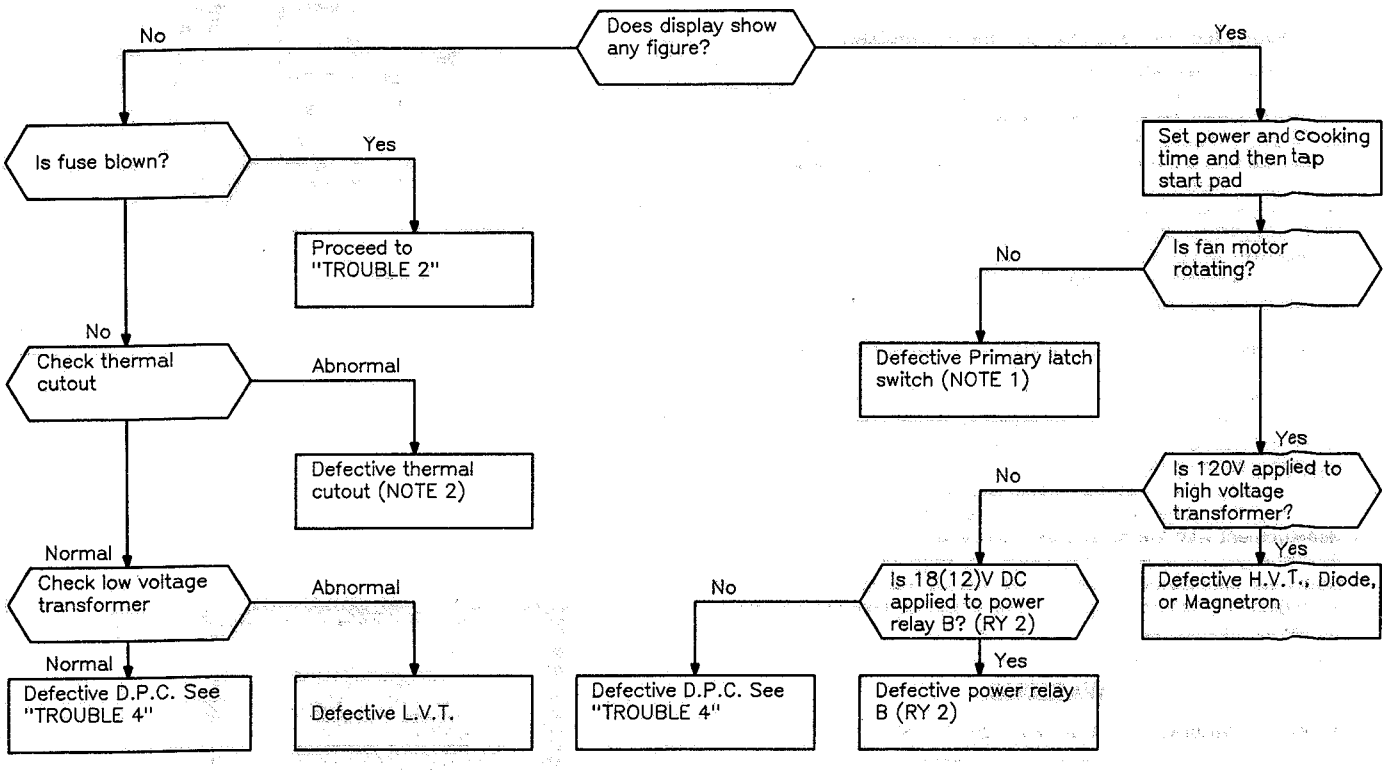
TROUBLESHOOTING GUIDE

CAUTION

1. Check grounding before checking for trouble.
2. Be careful of the high voltage circuit.
3. Discharge high voltage capacitor.
4. When checking the continuity of the switches or the high voltage transformer, disconnect one lead wire from these parts and then check continuity with the AC plug removed. To do otherwise may result in a false reading or damage to your meter.
   When disconnecting a plastic connector from a terminal, you must hold the plastic connector instead of the lead wire and then disconnect it, otherwise lead wire may be open or the connector cannot by removed.
5. Do not touch any parts of the circuitry on the digital programmer circuit, since static electric discharge may damage this control panel.
   Always touch yourself to ground while working on this panel to discharge any static charge in your body.
6. A 120V AC is present at the shaded area ▩ of the digital programmer circuit (Terminals of power relay B and primary circuit of low voltage transformer). When troubleshooting, be cautious of possible electrical shock hazard.

First of all operate the microwave oven following the correct operating procedures in order to find the exact cause of any trouble.

【TROUBLE 1】 Oven does not start cooking



NOTE 1: See "Component Test Procedure" and "Measurements and Adjustments" on previous pages.
NOTE 2: Check fan motor when thermal cutout (magnetron) is defective.

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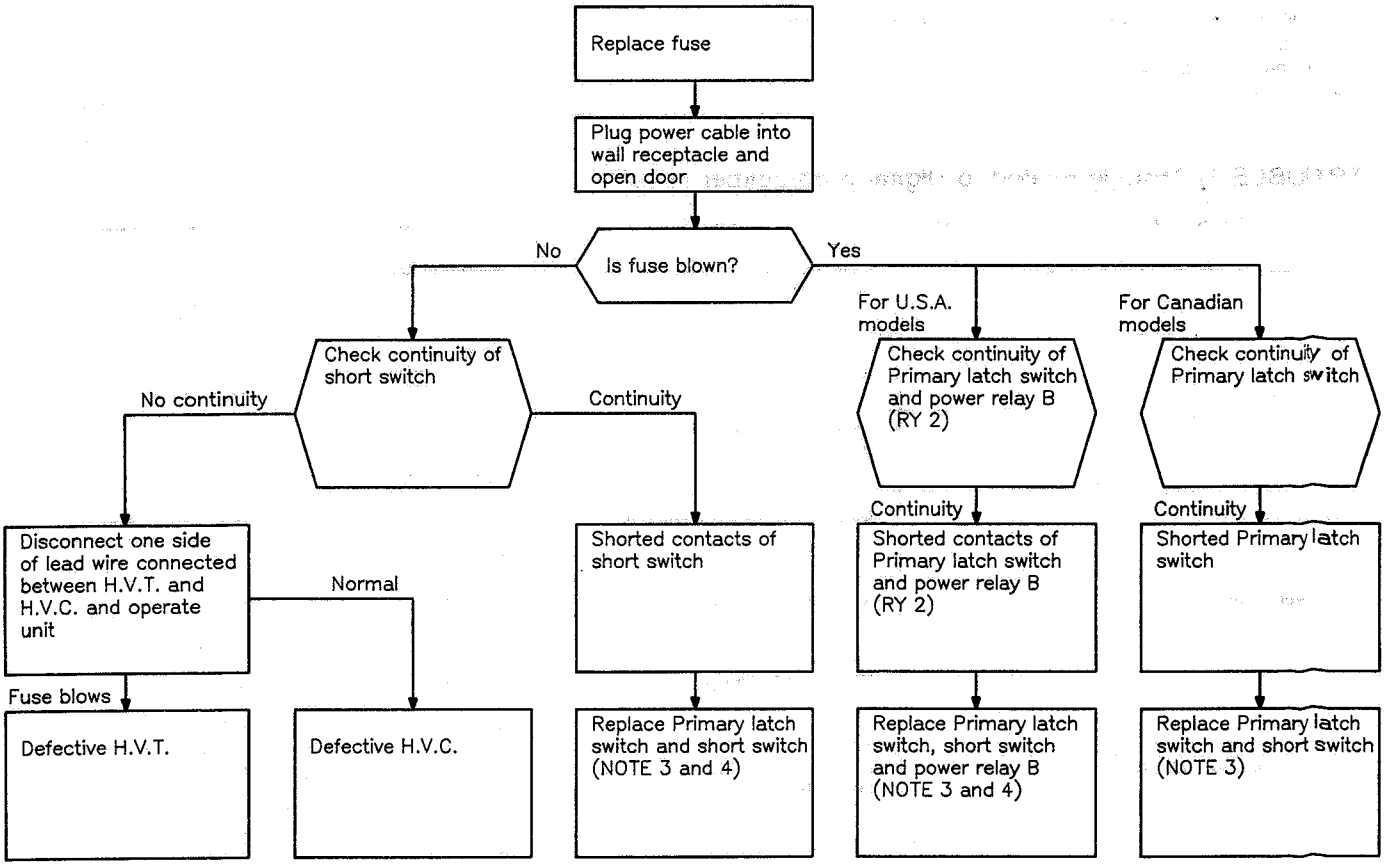
【TROUBLE 2】 Fuse is blown.


Replace fuse
Plug power cable into wall receptacle and open door
No
Is fuse blown?
Yes
For U.S.A. models
For Canadian models
Check continuity of short switch
No continuity
Continuity
Check continuity of Primary latch switch and power relay B (RY 2)
Check continuity of Primary latch switch
Continuity
Continuity
Disconnect one side of lead wire connected between H.V.T. and H.V.C. and operate unit
Normal
Shorted contacts of short switch
Shorted contacts of Primary latch switch and power relay B (RY 2)
Shorted Primary latch switch
Fuse blows
Defective H.V.T.
Defective H.V.C.
Replace Primary latch switch and short switch (NOTE 3 and 4)
Replace Primary latch switch, short switch and power relay B (NOTE 3 and 4)
Replace Primary latch switch and short switch (NOTE 3)

NOTE 3: All these switches must be replaced at same time.
(Refer to adjustment instructions.)
NOTE 4: Check continuity of power relay B's contacts (between 1 and 2) and if it has continuity, replace power relay B too.

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【TROUBLE 3】 Other troubles

CONDITIONS	POSSIBLE CAUSE	NOTE
Microwave output power is low. First of all, check if output power is really low by following "Measurement of microwave output".	1. Decrease in power source voltage. 2. Aging change of magnetron.	
Oven lamp and heater fan motor turn on when door is open.	1. Shorted contacts of Primary latch switch.	For U.S.A. models only.
Oven lamp and heater fan motor turn on when power supply cord is plugged into wall receptacle.	1. Open Secondary latch switch. 2. Shorted contacts of power relay A. (RY1) 3. Defective digital programmer circuit. (See trouble 4)	
Microwave oven does not operate normally, when auto sensor cooking is selected.	1. Open or loose wiring of sensor terminals from DPC. 2. Defective humidity sensor. 3. Defective DPC. (See trouble 4)	
Heater turns on when microwave cooking In this case, this trouble should be causing fuse and/or home circuit breaker to open.	1. Faulty power relay C(RY4) 2. Defective D.P.C.	
Heater does not turn on.	1. Defective heater 2. Faulty power relay C(RY4) 3. Defective D.P.C. (See trouble 4)	

CONDITIONS	POSSIBLE CAUSE	NOTE
"FF FF" appeares in display window after 2 minutes elapsed in the bake, broil, combination or convection cooking mode	1. Short or open oven temp sensor 2. Defective D.P.C.	

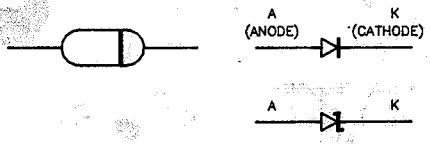
[TROUBLE 4] Trouble related to Digital programmer circuit

SYMPTOM	STEP	CHECK	RESULT	CAUSE/CORRECTIONS
No display when oven is first plugged in	1	Low voltage transformer (L.V.T.) secondary voltage	Abnormal (0V)	L.V.T.
			Normal	→ STEP 2
	2	IC-1 pin 64 voltage (Emitter of Q1)	Abnormal	ZD1,Q1
			Normal (5V)	→ STEP 3
	3	IC-1 pin 27 voltage (14 pin of IC-2)	Abnormal	IC-2
			Normal (Approx. 5V)	IC-1, CX1, DISPLAY
No key input	1	Membrane switch continuity	Abnormal	Membrane switch
			Normal	IC-1
No beep sound	1	IC-1 pin 23 voltage	Abnormal	IC-1
			Normal	→ STEP 2
	2	IC-3 pin 13 voltage	Abnormal	IC-3
			Normal	BZ
Heater does not turn on	1	IC-1 pin 19 voltage (at operation)	Abnormal	IC-1
			Normal	→ STEP 2
	2	IC-3 pin 12 voltage (at operation)	Abnormal	IC-3
			Normal	→ STEP 3
	3	Q5 transistor	Abnormal	Q5
			Normal	IC-2, RY-4
No microwave oscillation at any power setting	1	IC-1 pin 20 and 21 voltages (at High power operation)	Abnormal	IC-1
			Normal	→ STEP 2
	2	Q6 transistor	Abnormal	Q6
			Normal	IC-2, RY-2
Dark or unclear display	1	Replace DISP and check operation	Abnormal	IC-1
			Normal	DISP
Missing or lighting of unnecessary segment	1	Replace IC-1 and check operation	Abnormal	DISP
			Normal	IC-1

TO BE CONTINUED FOR AUTO SENSOR MODELS				
SYMPTOM	STEP	CHECK	RESULT	CAUSE/CORRECTIONS
Oven stops it's operation 30 seconds after the start pad is tapped. Humidity sensor heater stay red glows for 30 sec.	1	Short circuit across the sensor terminals and check the operation	Oven operates continuously until cancel pad is tapped. Heater shut off by itself	Humidity sensor
			Still oven stops operation at 30 seconds.	C6, Q3, IC-1
Humidity sensor heater does not heat up at all	1	Heater terminals voltage	Normal AC 5-10V	Humidity sensor heater open
			No voltage	→ STEP 2
	2	LVT voltage between S1 and S2	No voltage	LVT
			Normal AC 10~20V	D20 triac,IC-1, Q20

HOW TO CHECK THE SEMICONDUCTORS USING AN OHM METER

Diode



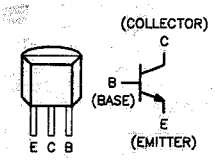
	FORWARD	REVERSE
A-K	SMALL	∞

Transistor

NPN Transistor

2SC·····

2SD·····

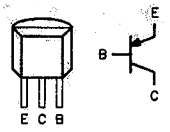


	FORWARD	REVERSE
B-E	SMALL	∞
B-C	SMALL	∞
C-E	∞	∞

PNP Transistor

2SA·····

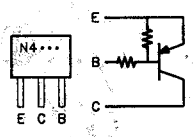
2SB·····



	FORWARD	REVERSE
E-B	SMALL	∞
C-B	SMALL	∞
C-E	∞	∞

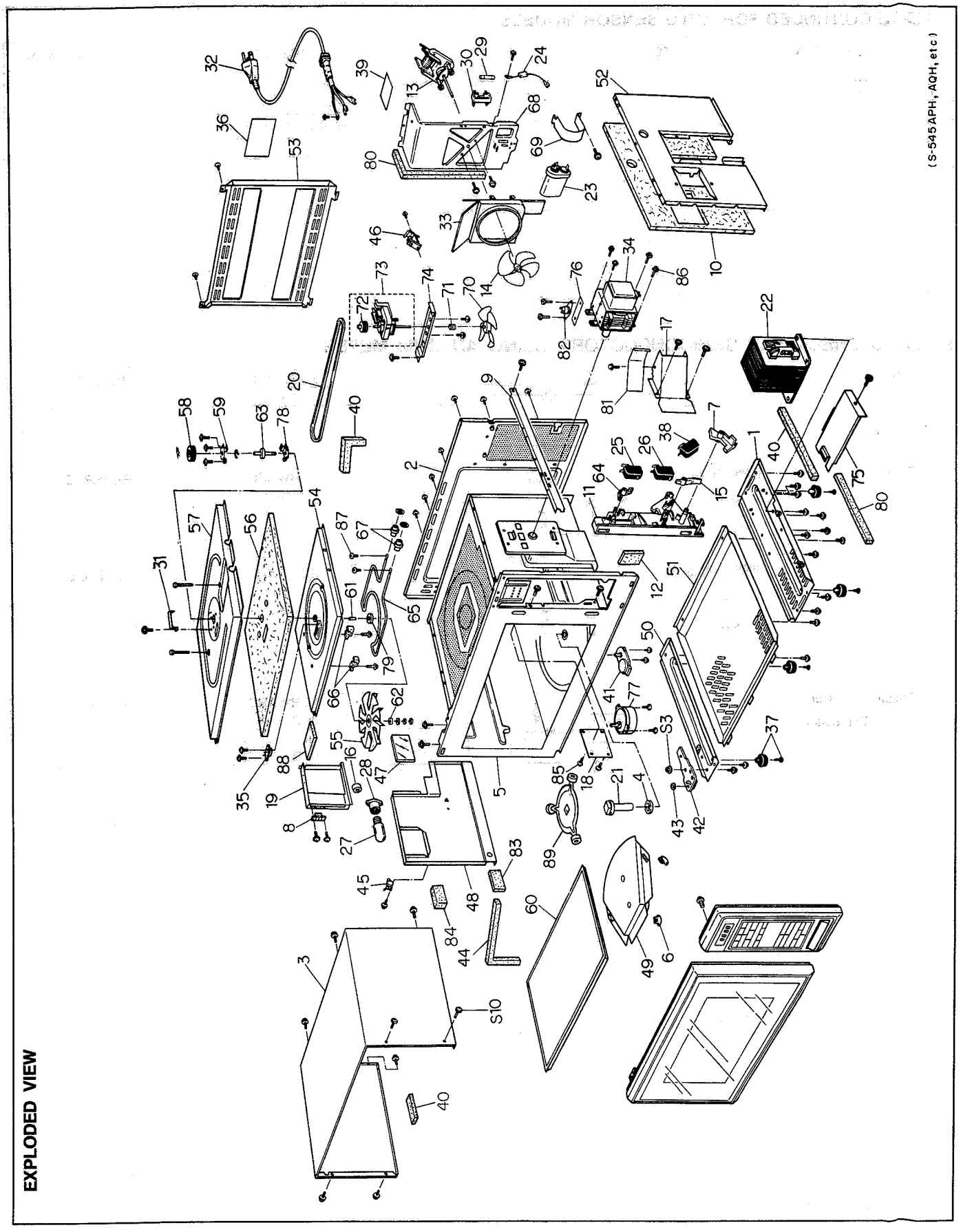
Digital Transistor

PNP Transistor

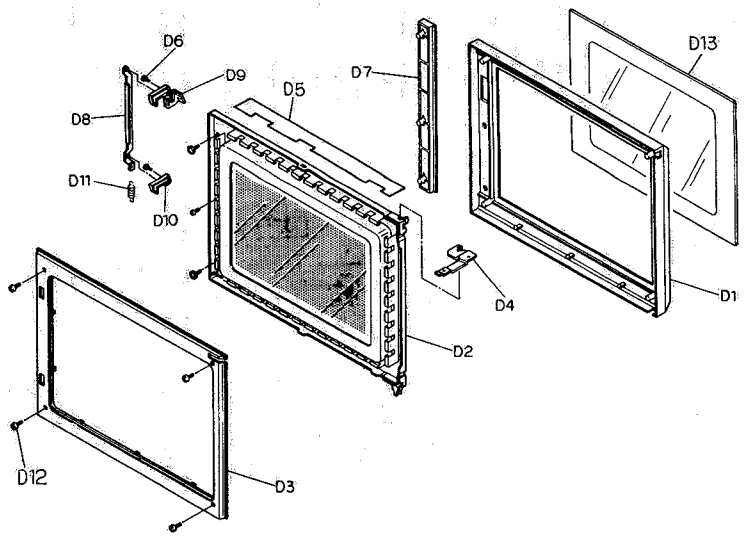


	FORWARD	REVERSE
E-B	10kΩ~30kΩ	10kΩ~30kΩ
C-B	50kΩ~90kΩ	∞
C-E	40kΩ~80kΩ	∞

EXPLODED VIEW AND PARTS LIST

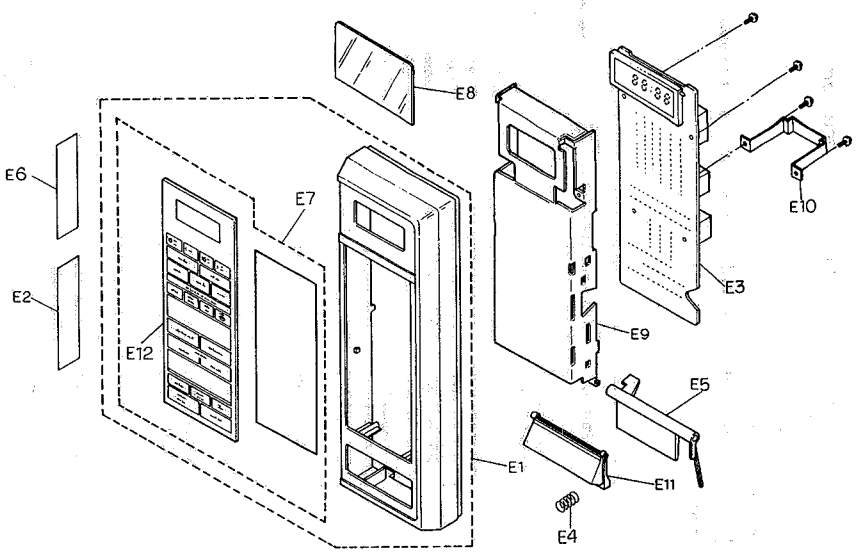


DOOR ASSEMBLY



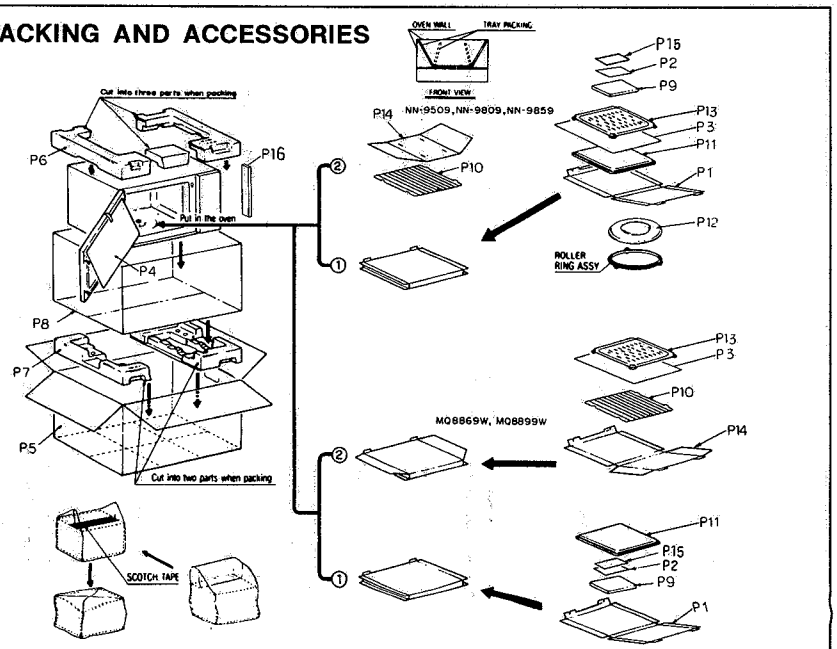
(S-545APH, AQH, etc)

ESCUTCHEON BASE ASSEMBLY



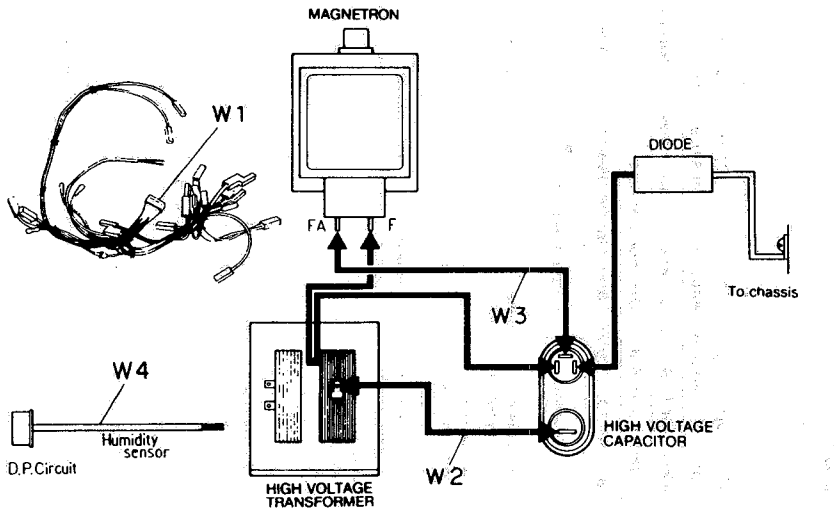
(S-545APH, AQH, etc)

PACKING AND ACCESSORIES



(S-545APH, AQH, etc)

WIRING MATERIAL



(S-545 APH, AQH, etc)

PARTS LIST

NOTE 1: When ordering replacement part(s), please use part number(s) shown in this parts list. Do not use description of the part.

2: Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.

3: Alphabet marks in Remarks columns (i.e. APH, AQH, etc) indicate parts applicable to only specified country models as follows

APH: For U.S.A. and some of Latin America countries, CPH: For Canada

AQH: For U.S.A., CQH: For Canada

Parts without these marks can be used for all models.

Ref. No.		Part No.	Part Name & Description	Pcs/ Set	Remarks
1-1		A10015450AP	Base	1	NN-9509, NN-9809, NN-9859
1-2		A10014250AP	Base	1	MQ8869W, MQ8899W
2-1		A10045450AP	Back panel	1	NN-9509, NN-9809, NN-9859
2-2		A10044250AP	Back panel	1	MQ8869W, MQ8899W
3-1		A10095450AP	Cabinet body	1	NN-9509, NN-9809
3-2		A10095460HAP	Cabinet body	1	NN-9859
3-3		A10094250AP	Cabinet body assy	1	MQ8869W, MQ8899W
4		ANE2177-F80	Washer	1	NN-9509, NN-9809, NN-9859
5-1	⚠	A200A5450AP	Oven	1	NN-9509, NN-9809, NN-9859
5-2	⚠	A200A5450AQ	Oven	1	MQ8869W, MQ8899W
6		A20194210AQ	Stirrer stopper	2	MQ8869W, MQ8899W
7-1		A31374650AP	Hook spacer B	1	NN-9509, NN-9809, NN-9859
7-2		ANE31372Q0AP	Hook spacer B	1	MQ8869W, MQ8899W
8		A601L4780AP	Humidity sensor	1	NN-9809, NN-9859, MQ8899W
9		A20365450AP	Reinforce bracket B	1	
10		A22434250AP	Adiabatic material B	1	MQ8869W, MQ8899W
11-1	⚠	A30204310AG	Door hook A	1	NN-9509, NN-9809, NN-9859
11-2	⚠	ANE30207J0AP	Door hook A	1	MQ8869W, MQ8899W
12		ANE0901000CD	Cushion rubber A	1	MQ8869W, MQ8899W
13-1		A400A4010AP	Fan motor	1	NN-9509, NN-9809, NN-9859 AC, 24W, Single
13-2		A400A4210AP	Fan motor	1	MQ8869W, MQ8899W AC, 24W, Single
14		ANE40086W0AP	Fan	1	
15-1		A31384650AP	Hook spacer C	1	NN-9509, NN-9809, NN-9859
15-2		ANE31382Q0AP	Hook spacer C	1	MQ8869W, MQ8899W
16		ANE6075X70AP	Spacer	1	NN-9509, NN-9809, NN-9859
17-1		A40255450AP	Air guide A	1	NN-9509, NN-9809, NN-9859
17-2		A40254250AP	Air guide A	1	MQ8869W, MQ8899W
18		A20555450AP	Cover A	1	NN-9509, NN-9809, NN-9859
19-1		A400K5020AQ	Exhaust guide	1	NN-9509
19-2		A400K5040AQ	Exhaust guide	1	NN-9809, NN-9859
19-3		A400K4250AP	Exhaust guide	1	MQ8869W
19-4		A400K4260AP	Exhaust guide	1	MQ8899W
20-1		A41555450AP	Belt C	1	NN-9509, NN-9809, NN-9859 (Si)
20-2		A41554250AP	Belt C	1	MQ8869W, MQ8899W (Si)
21		A21315450AP	Pulley shaft	1	NN-9509, NN-9809, NN-9859
22-1	⚠	A600B5180AP	H.V.Transformer	1	NN-9509, NN-9809, NN-9859 (1.4KVA)
22-2	⚠	A600B4210AP	H.V.Transformer	1	MQ8869W, MQ8899W (1.4KVA)
23-1	⚠	A60904650AP	H.V.Capacitor	1	NN-9509, NN-9809, NN-9859 (0.951μF, AC2000V)
23-2	⚠	A60904010AP	H.V.Capacitor	1	MQ8869W, MQ8899W (0.935μF, AC2000V)
24	⚠	A62024000AP	Diode	1	(Si, 0.35mA)
25-1, 26-1	⚠	ANE61424L0AG	Micro switch	2	Primary/Secondary latch switch (V-16G-3C26) MQ8869W, MQ8899W
25-2	⚠	ANE61424L0AG	Micro switch	1	Primary latch switch (V-16G-3C26) NN-9509, NN-9809, NN-9859
26-2	⚠	A61424650AP	Micro switch	1	Secondary latch switch NN-9509, NN-9809, NN-9859 (L-3C2-MR)
27		ANE6030540AP	Incandescent lamp	1	(125V, 20W)
28		A61524210AA	Oven lamp socket	1	
29	⚠	ANE6230B00AP	Fuse	1	(125V, 15A)
30		A62314000AP	Fuse holder	1	

Ref. No.		Part No.	Part Name & Description	Pcs/ Set	Remarks
31		A12074250AP	Reinforce bracket	1	MQ8869W, MQ8899W
32-1		A900C5020AP	AC cord W/plug	1	NN-9509, NN-9809, NN-9859 APH (125V)
32-2		A900C5020CQ	AC cord W/plug	1	NN-9859 CPH (125V)
32-3		A900C4250AP	AC cord W/plug	1	MQ8869W, MQ8899W AQH (125V)
32-4		A900C4250CP	AC cord W/plug	1	MQ8899W CQH (125V)
33-1		A41445020AP	Orifice	1	NN-9509, NN-9809, NN-9859
33-2		A41444250AP	Orifice	1	MQ8869W, MQ8899W
34	⚠	2M210-M1C	Magnetron	1	
35		A605Y4210AQ	Oven temp sensor	1	
36-1		A00064650AP	Warning label	1	NN-9509, NN-9809, NN-9859 APH, MQ8869W, MQ8899W AQH
36-2		ANE0006R30CP	Warning label	1	NN-9859 CPH, MQ8899W CQH
37		ANE1008-3WO	Rubber foot	4	
38-1	⚠	ANE6178-5R0	Micro switch	1	NN-9509, NN-9809, NN-9859 Short switch (L-2C2-MR)
38-2	⚠	ANE61784L0AG	Micro switch	1	MQ8869W, MQ8899W Short switch (V-16G-2C25)
39-1		A00335020AP	Fuse label	1	NN-9509, NN-9809, NN-9859
39-2		A00335450AQ	Fuse label	1	MQ8869W, MQ8899W AQH
39-3		A00334210AP	Fuse label	1	MQ8899W CQH
40		ANE000Z000AA	Cushion rubber	3	MQ8869W, MQ8899W
41		A61444000AQ	Antenna motor	1	MQ8869W, MQ8899W (AC, 2W, Single)
42-1	⚠	A30075450AP	Lower hinge	1	NN-9509, NN-9809, NN-9859
42-2	⚠	A301L4210AP	Lower hinge	1	MQ8869W, MQ8899W
43		ANE3081B60AP	Door hinge spacer	1	MQ8869W, MQ8899W
44		ANE0929000AJ	Cushion rubber C	1	MQ8869W, MQ8899W
45		A61454210AP	Thermal cutout	1	
46		ANE11408A0AG	Stopper A	1	
47		A64374250AP	Glass plate	1	MQ8869W, MQ8899W (For oven lamp)
48		A22374250AP	Left heater panel	1	MQ8869W, MQ8899W
49		A202K4250AQ	Antenna	1	MQ8869W, MQ8899W (Moving antenna)
50-1		A11295450AP	Base B	1	NN-9509, NN-9809, NN-9859
50-2		A11294250AP	Base B	1	MQ8869W, MQ8899W
51-1		A10265450AP	Base C	1	NN-9509, NN-9809, NN-9859
51-2		A10264250AP	Base C	1	MQ8869W, MQ8899W
52-1		A22365450AP	Right heater panel	1	NN-9509, NN-9809, NN-9859
52-2		A22364250AQ	Right heater panel	1	MQ8869W, MQ8899W
53-1		A10585450AP	Back panel cover A	1	NN-9509, NN-9809, NN-9859
53-2		A10584250AP	Back panel cover A	1	MQ8869W, MQ8899W
54-1		A21445450AP	Upper panel B	1	NN-9509, NN-9809, NN-9859
54-2		A203L4250AP	Upper panel B	1	MQ8869W, MQ8899W
55-1		ANE22392L0AP	Circulation fan	1	NN-9509, NN-9809, NN-9859
55-2		A22394250AP	Circulation fan	1	MQ8869W, MQ8899W
56-1		A22425450AP	Adiabatic material A	1	NN-9509, NN-9809, NN-9859
56-2		A22424250AP	Adiabatic material A	1	MQ8869W, MQ8899W
57-1		A22785450AP	Upper heater panel	1	NN-9509, NN-9809, NN-9859
57-2		A22784250AP	Upper heater panel	1	MQ8869W, MQ8899W
58-1		A41325020AQ	Pulley B	1	NN-9509, NN-9809, NN-9859
58-2		ANE41322L0AP	Pulley B	1	MQ8869W, MQ8899W
59-1		A41575450AP	Fan bracket A	1	NN-9509, NN-9809, NN-9859
59-2		A41574250AP	Fan bracket A	1	MQ8869W, MQ8899W
60		A010T4250AQ	Shelf	1	MQ8869W, MQ8899W
61		A41614210AQ	Spacer A	1	MQ8869W, MQ8899W

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Ref. No.		Part No.	Part Name & Description	Pcs/ Set	Remarks
62		ANE41622L0AP	Spacer B	1	MQ8869W, MQ8899W
63-1		A41645450AP	Shaft assy	1	NN-9509, NN-9809, NN-9859
63-2		A41644210AQ	Shaft assy	1	MQ8869W, MQ8899W
64		ANE31362Q0AP	Hook spacer A	1	MQ8869W, MQ8899W
65-1		ANE630G2L0CP	Heater A	1	NN-9509, NN-9809, NN-9859
65-2		A630G4210AQ	Heater A	1	MQ8869W, MQ8899W
66-1		A64175130AP	Heater support	2	NN-9509, NN-9809, NN-9859
66-2		A64174210AQ	Heater support	2	MQ8869W, MQ8899W
67		ANE6501K90AP	Holder C	2	
68		A41124250AP	Fan motor bracket B	1	MQ8869W, MQ8899W
69-1		A61884060AP	Capacitor bracket	1	NN-9509, NN-9809, NN-9859
69-2		ANE6037X00AP	Capacitor bracket	1	MQ8869W, MQ8899W
70-1		A40085020AQ	Fan	1	NN-9509, NN-9809, NN-9859
70-2		ANE40082L0AP	Fan	1	MQ8869W, MQ8899W
71		ANE4057-F50	Spring	1	MQ8869W, MQ8899W
72		ANE41312L0AP	Pulley A	1	MQ8869W, MQ8899W
73-1		A41795450AP	Heater fan motor assy	1	NN-9509, NN-9809, NN-9859
73-2		A41794210AP	Heater fan motor assy	1	MQ8869W, MQ8899W
74-1		A41805450AP	Bracket	1	NN-9509, NN-9809, NN-9859
74-2		A41804250AP	Bracket	1	MQ8869W, MQ8899W
75		A11264210CP	Base metal	1	MQ8899W CQH
76		A62384310AG	Spacer	1	MQ8869W, MQ8899W
77		A63265450AP	Turntable motor	1	NN-9509, NN-9809, NN-9859
78-1		A41585450AP	Fan bracket B	1	NN-9509, NN-9809, NN-9859
78-2		A41584210AQ	Fan bracket B	1	MQ8869W, MQ8899W
79-1		A41635020AQ	Spacer C	1	NN-9509, NN-9809, NN-9859
79-2		A41634250AP	Spacer C	1	MQ8869W, MQ8899W
80		ANE000Z000AB	Cushion rubber C	2	NN-9509, NN-9809, NN-9859
81		A40264250AP	Air guide B	1	MQ8869W, MQ8899W
82		A61454000AP	Thermal cutout	1	MQ8869W, MQ8899W
83		ANE0902000DB	Cushion rubber A	1	MQ8869W, MQ8899W
84		ANE0924000DE	Cushion rubber C	1	MQ8869W, MQ8899W
85		XST4+5VS	Screw 4×5	1	
86		XTWANE4+10RU	Tapping screw 4×10	4	
87		XYT4+C8VS	Screw 4×8	2	
88		A41034210AQ	Air guide cushion B	1	MQ8869W, MQ8899W89
89		A200P5450AP	Metal turntable	1	NN-9509, NN-9809, NN-9859

DOOR ASSEMBLY

D1-1	⚠	A302A5450AP	Door A assy	1	NN-9509, NN-9809
D1-2	⚠	A302A5460HAP	Door A assy	1	NN-9859
D1-3	⚠	A30014250AQ	Door A assy	1	MQ8869W, MQ8899W
D2-1	⚠	A302K5450AP	Door E assy	1	NN-9509, NN-9809, NN-9859
D2-2	⚠	A302K4250AP	Door E assy	1	MQ8869W, MQ8899W
D3-1	⚠	A30855450AP	Door C	1	NN-9509, NN-9809
D3-2	⚠	A30855460HAP	Door C	1	NN-9859
D3-3	⚠	A30854250AP	Door C	1	MQ8869W, MQ8899W
D4-1	⚠	A300B5450AP	Upper hinge	1	NN-9509, NN-9809, NN-9859
D4-2	⚠	A300B4210AP	Upper hinge	1	MQ8869W, MQ8899W
D5		A30884250AP	Ferrite rubber	1	MQ8869W, MQ8899W
D6		ANE30567J0AP	Door key pin	2	MQ8869W, MQ8899W
D7		A30124250AQ	Door handle	1	MQ8869W, MQ8899W
D8		A301H4210AP	Door key lever B	1	MQ8869W, MQ8899W
D9-1		A30184650AP	Door key A	1	NN-9509, NN-9809, NN-9859
D9-2		ANE30182Q0AP	Door key A	1	MQ8869W, MQ8899W
D10		ANE30192Q0AP	Door key B	1	MQ8869W, MQ8899W
D11-1		A30214000AP	Door key spring	1	NN-9509, NN-9809, NN-9859
D11-2		ANE3021X00AP	Door key spring	1	MQ8869W, MQ8899W
D12-1		XTBANE4+12FK	Tapping screw 4×12	4	NN-9509, NN-9809, MQ8869W, MQ8899W
D12-2		XTBANE4+12FC	Tapping screw 4×12	4	NN-9859
D13		A31465450AQ	Door screen B assy	1	MQ8869W, MQ8899W

Ref. No.		Part No.	Part Name & Description	Pcs/ Set	Remarks

ESCUTCHEON BASE ASSEMBLY

E1-1		A800L5450AP	Escutcheon base assy	1	NN-9509 (NOTE 4) (With Membrane switch assy)
E1-2		A800L5460AP	Escutcheon base assy	1	NN-9809 (NOTE 4) (With Membrane switch assy)
E1-3		A800L5460HAP	Escutcheon base assy	1	NN-9859 (NOTE 4) (With Membrane switch assy)
E1-4		A80344250AQ	Escutcheon base	1	MQ8869W, MQ8899W (NOTE 4)
E2-1		A01575450AP	Name plate	1	NN-9509
E2-2		A01575460AP	Name plate	1	NN-9809
E2-3		A01575460HAP	Name plate	1	NN-9859 APH
E2-4		A01575450AQ	Name plate	1	MQ8869W
E2-5		A01575460AQ	Name plate	1	MQ8899W AQH
E3-1		A603L5450AP	D.P.Circuit assy	1	NN-9509 (W/Component)
E3-2		A603L5460AP	D.P.Circuit assy	1	NN-9809, NN-9859 (W/Component)
E3-3		A603L5450AQ	D.P.Circuit assy	1	MQ8869W(W/Component)
E3-4		A603L5460AQ	D.P.Circuit assy	1	MQ8899W(W/Component)
E4		ANE80378A0AG	Spring	1	NN-9509, NN-9809, NN-9859
E5-1		A82565110BP	Door opening lever	1	NN-9509, NN-9809, NN-9859
E5-2		A82564210AP	Door opening lever	1	MQ8869W, MQ8899W
E6-1		ANE0245X00AP	DHHS label	1	NN-9509, NN-9809, NN-9859 APH MQ8869W, MQ8899W AQH
E6-2		A04115020CQ	CSA caution label	1	NN-9859 CPH MQ8899W CQH
E7-1		A630Y5450AP	Membrane switch assy	1	NN-9509 (With Escutcheon sheet)
E7-2		A630Y5460AP	Membrane switch assy	1	NN-9809 (With Escutcheon sheet)
E7-3		A630Y5460HAP	Membrane switchassy	1	NN-9859 (With Escutcheon sheet)
E7-4		A64795450AQ	Membrane switch	1	MQ8869W
E7-5		A64795460AQ	Membrane switch	1	MQ8899W
E8		A81264250AQ	Smoke panel	1	MQ8869W, MQ8899W
E9-1		A81275450AP	Bracket	1	NN-9509, NN-9809, NN-9859
E9-2		A81274210AQ	Bracket	1	MQ8869W, MQ8899W
E10-1		A65514210AQ	L.V.T.Support bracket	1	MQ8869W
E10-2		ANE6551R20AP	L.V.T.Support bracket	1	MQ8899W
E11-1		A80725110BP	Door opening button	1	NN-9509, NN-9809
E11-2		A80725090HAQ	Door opening button	1	NN-9859
E11-3		A80724210AP	Door opening button	1	MQ8869W, MQ8899W
E12-1		A83375450AP	Escutcheon sheet	1	NN-9509
E12-2		A83375460AP	Escutcheon sheet	1	NN-9809
E12-3		A83375460HAP	Escutcheon sheet	1	NN-9859

PACKING AND ACCESSORIES

P1-1		A01175460CP	Packing B	1	NN-9859
P1-2		A01174250AQ	Packing B	1	MQ8899W CQH
P2-1		A00035450AP	Instruction book	1	NN-9509, NN-9809, NN-9859 APH
P2-2		A00035460CP	Instruction book	1	NN-9859 CPH
P2-3		A00035450AQ	Instruction book	1	MQ8869W, MQ8899W AQH
P2-4		A00035450CQ	Instruction book	1	MQ8899W CQH
P3-1		A02075450AP	Styrol sheet	1	NN-9509, NN-9809, NN-9859
P3-2		ANE02072L0AP	Styrol sheet	1	MQ8899W CQH
P4		ANE0107580AP	Door sheet	1	
P5-1		A01025450AP	Packing case, paper	1	NN-9509
P5-2		A01025460AP	Packing case, paper	1	NN-9809
P5-3		A01025460HAP	Packing case, paper	1	NN-9859 APH
P5-4		A01025460HCP	Packing case, paper	1	NN-9859 CPH
P5-5		A01025450AQ	Packing case, paper	1	MQ8869W
P5-6		A01025460AQ	Packing case, paper	1	MQ8899W AQH
P5-7		A01025460CQ	Packing case, paper	1	MQ8899W CQH
P6-1		A01045450AP	Upper filler	1	NN-9509, NN-9809, NN-9859
P6-2		A01044250AP	Upper filler	1	MQ8869W, MQ8899W

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Ref. No.		Part No.	Part Name & Description	Pcs/ Set	Remarks
P7-1		A01054210AP	Lower filler	1	NN-9509, NN-9809, NN-9859
P7-2		A01054250AP	Lower filler	1	MQ8869W, MQ8899W
P8-1		A01065200AP	Vinyl cover	1	NN-9509, NN-9809, NN-9859
P8-2		A01065130AP	Vinyl cover	1	MQ8869W, MQ8899W
P9-1		A000B5130AP	Cook book	1	NN-9509, NN-9809, NN-9859 APH
P9-2		A000B5130CP	Cook book	1	NN-9859 CPH
P9-3		A000B5140AQ	Cook book	1	MQ8869W, MQ8899W AQH
P9-4		A000B5140CQ	Cook book	1	MQ8899W CQH
P10-1		A06025450AP	Oven rack	1	NN-9509, NN-9809, NN-9859
P10-2		A06025450AQ	Oven rack	1	MQ8869W, MQ8899W
P11		A06034250AP	Broiler pan	1	NN-9859,MQ8899W CQH
P12		A06015450AP	Metal tray	1	NN-9509, NN-9809, NN-9859
P13		A06484250AP	Spatter shield	1	NN-9859,MQ8899W CQH
P14-1		A01085450AP	Tray packing	1	NN-9509, NN-9809
P14-2		A01085460CP	Tray packing	1	NN-9859
P14-3		A01084250AG	Tray packing	1	MQ8869W, MQ8899W AQH
P14-4		A01084250AQ	Tray packing	1	MQ8899W CQH
P15		ANE0169B60CP	Servicenter list	1	NN-9859 CPH,MQ8899W CQH
P16		A01454250AP	Door sheet B	1	MQ8869W, MQ8899W
WIRING MATERIAL					
W1-1		A030A5450AP	Lead wire harness	1	NN-9509, NN-9809, NN-9859 APH
W1-2		A030A5460CP	Lead wire harness	1	NN-9859 CPH
W1-3		A030A5450AQ	Lead wire harness	1	MQ8869W, MQ8899W AQH
W1-4		A030A5460CQ	Lead wire harness	1	MQ8899W CQH
W2		A03504000AP	Lead wire	1	
W3-1		A03514000AP	Lead wire	1	NN-9509, NN-9809, NN-9859 (NOTE 5)
W3-2		A03504210AP	Lead wire	1	MQ8869W, MQ8899W (NOTE 5)
W4		A03535040AP	Lead wire	1	NN-9809, NN-9859, MQ8899W

NOTE 4: Please order name plate and either DHHS label or CSA caution label together.
5: When this lead wire is open, replace together with magnetron.

DIGITAL PROGRAMMER CIRCUIT

PARTS LIST (NN-9509, NN-9809, NN-9859, MQ8869W, MQ8899W)

Ref. No.	Part No.	Description	Pcs/ Set	Remarks
DISP	A64565040AP	Fluorescent tube	1	
SPACER	A82844210AP	Spacer cushion	1	For DISP
T1	A62495020AQ	L.V.Transformer	1	NN-9509 (4.5VA)
T1	A62495040AP	L.V.Transformer	1	NN-9809, NN-9859 (12VA)
T1	A62494210AQ	L.V.Transformer	1	MQ8869W (5.1VA)
T1	A62495460AQ	L.V.Transformer	1	MQ8899W
CN1	AEEMMA15509W	9 pin connector	1	
CN2,3	AEEMMC00F04W	4 pin connector	2	
CN4	AEEM11FDZBTM	11 pin connector	1	NN-9509, NN-9809, NN-9859
CN4	AEEMWD1012	12 pin connector	1	MQ8869W, MQ8899W
CN5	AEEMMA07507W	7 pin connector	1	NN-9809, NN-9859, MQ8899W
BZ	AEFB22EP2002	Buzzer	1	2kHz
CX1	AEFFT4R19GW	Ceramic resonator	1	4.19MHz
RY1	AEAWJZDC18A	Power relay	1	(18V)
RY2,4	AEBG5J12TA1	Power relay	2	(12V)
RY5	AEBVG-18P-0	Power relay	1	(18V)
ZNR	ERZC10DK471F	ZNR	1	
IC1	AEIC50940172	L.S.I. (MOS Microprocessor IC)	1	NN-9509, NN-9809, NN-9859
IC1	AEIC50940173	L.S.I. (MOS Microprocessor IC)	1	MQ8869W, MQ8899W
IC2	AN6752	I.C. (Bipolar Linear IC)	1	
IC3	AEICBA12004	I.C.	1	
Q1	2SD2006-RTA	Transistor, Si 250mW	1	(120MHz)
Q2	UN4211-(TA)	Transistor, Si 300mW	1	NN-9809, NN-9859, MQ8899W
Q3	2SC1685-RTA	Transistor, Si 250mW	1	NN-9809, NN-9859, MQ8899W (150MHz)
Q5	UN4123-(TA)	Transistor, Si	1	
Q6	2SC1318-RTA	Transistor, Si 400mW	1	(200MHz)
D1,2	AEDNERA1502	Diode, Si	2	(0.1A)
D3,4,6,7,8,9	MA195-(TA5)	Diode, Si	6	NN-9509, MQ8869W (0.1A)
D3,4,5,6,7,8,9	MA195-(TA5)	Diode, Si	7	NN-9809, NN-9859, MQ8899W (0.1A)
D20	AESMAC03DGMB	Triac	1	NN-9809, NN-9859, MQ8899W
ZD1	AEDZ5R6ES2T1	Zener diode, Si	1	
ZD2	AEDZ4R7ES3T1	Zener diode, Si	1	
ZD4	AEDZ4R3ES3T1	Zener diode, Si	1	NN-9809, NN-9859, MQ8899W
ZD5	AEDZ15ES3T1	Zener diode, Si	1	
C1	ECEA1VU102E	Electrolytic capacitor, Al	1	1000μF, −10%+30%, 35V
C2	ECEA1VU221B	Electrolytic capacitor, Al	1	220μF, −10%+30%, 35V
C3	ECEA1CU220B	Electrolytic capacitor, Al	1	22μF, −10%+30%, 16V
C5	ECEA1HU010B	Electrolytic capacitor, Al	1	NN-9809, NN-9859, MQ8899W 1μF, −10%+30%, 50V
C6	ECEA1HUR47B	Electrolytic capacitor, Al	1	NN-9809, NN-9859, MQ8899W 0.47μF, −10%+30%, 50V
C7	ECBT1H102KB5	Ceramic capacitor	1	NN-9809, NN-9859, MQ8899W (Single layer) 0.001μF, ±10%, 50W
C8	ECKR1H103ZF	Ceramic capacitor	1	(Single layer) 0.01μF, −20%+80%, 50V
C9,10,11,12,14	ECBT1E103ZF5	Ceramic capacitor	5	NN-9509, NN-9809, NN-9859 (Single layer) 0.01μF, −20%+80%, 25V
C10,11,12,14	ECBT1E103ZF5	Ceramic capacitor	4	MQ8869W, MQ8899W (Single layer) 0.01μF, −20%+80%, 25V
C13	ECEA1HU4R7B	Electrolytic capacitor, Al	1	0.47μF, −10%+30%, 50V
C17	AECF055F104Z	Ceramic capacitor	1	MQ8869W, MQ8899W (Multi layer) 0.1μF, −20%+80%, 50V
R1,2	ERDS2TJ201T	Carbon film resistor	2	NN-9509, MQ8869W 200Ω, ±5%, 1/4W
R1,2,12,15	ERDS2TJ201T	Carbon film resistor	4	NN-9809, NN-9859, MQ8899W 200Ω, ±5%, 1/4W
R3,19,20,21,24,41,43,48,C7,	ERDS2TJ103T	Carbon film resistor	9	NN-9509, MQ8869W 10kΩ, ±5%, 1/4W
R3,19,20,21,24,41,42,43	ERDS2TJ103T	Carbon film resistor	8	NN-9809, NN-9859, MQ8899W 10kΩ, ±5%, 1/4W
R4,5,23,28,29,30,31	ERDS2TJ751T	Carbon film resistor	7	NN-9509, MQ8869W 750Ω, ±5%, 1/4W
R4,5,6,7,23,28,29,30,31	ERDS2TJ751T	Carbon film resistor	9	NN-9809, NN-9859, MQ8899W 750Ω, ±5%, 1/4W
R17	EROS2TKF8662	Metal film resistor	1	NN-9809, NN-9859, MQ8899W 86.6kΩ, ±1%, 1/4W
R18	ERDS2TJ914T	Carbon film resistor	1	910kΩ, ±5%, 1/4W
R22,27	ERDS2TJ512T	Carbon film resistor	2	NN-9509, MQ8869W 5.1kΩ, ±5%, 1/4W
R13,14,22,27	ERDS2TJ512T	Carbon film resistor	4	NN-9809, NN-9859, MQ8899W 5.1kΩ, ±5%, 1/4W
R25	ERDS2TJ105T	Carbon film resistor	1	NN-9509, MQ8869W 1MΩ, ±5%, 1/4W
R16,25	ERDS2TJ105T	Carbon film resistor	2	NN-9809, NN-9859, MQ8899W 1MΩ, ±5%, 1/4W
R26	ERDS2TJ153T	Carbon film resistor	1	15kΩ, ±5%, 1/4W
R34,35	ERDS2TJ300T	Carbon film resistor	2	30Ω, ±5%, 1/4W
R38,39	ERDS2TJ390T	Carbon film resistor	2	NN-9509, NN-9809, NN-9859, MQ8899W 39Ω, ±5%, 1/4W
R38,39,49	ERDS2TJ390T	Carbon film resistor	3	MQ8869W 39Ω, ±5%, 1/4W
R46	ERDS2TJ181T	Carbon film resistor	1	NN-9509, MQ8869W 180Ω, ±5%, 1/4W
R8,9,10,11,46	ERDS2TJ181T	Carbon film resistor	5	NN-9809, NN-9859, MQ8899W 180Ω, ±5%, 1/4W
R47	ERDS2TJ330T	Carbon film resistor	1	33Ω, ±5%, 1/4W
Z1	AEXB04153J	Compound resistor	1	15kΩ×4, ±5%, 1/8W

SERVICE FIXTURES AND TOOLS

EXTENSION CABLES

NOTE: To be used when repairing the DPC board assembly directly on the oven for easy access of the board.

Ref. No.	Part No.	Description	Pcs/ Set	Remarks
	AT40M004	4 pin extension cable	1	Cable No.16
	AT40M009	9 pin extension cable	1	Cable No.33
	AT40M007	7 pin extension cable	1	Cable No.37
	AT40E006	1 pin×6 extension cable	1	Cable No.9

DPC COMMON CHECKER AND ITS CABLE

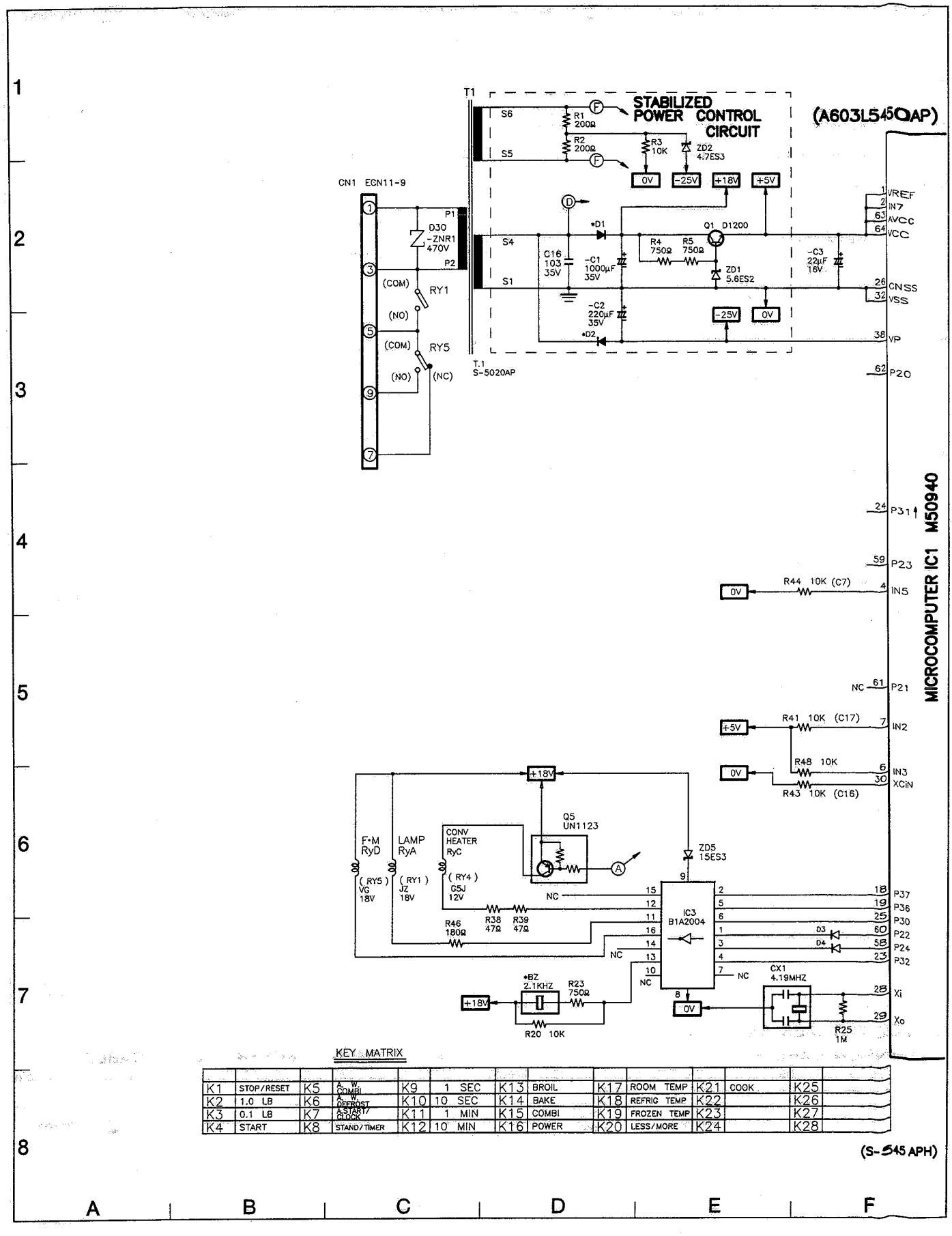
NOTE: To be used only when DPC common checker is available.

Ref. No.	Part No.	Description	Pcs/ Set	Remarks
	ANE600ZK70AP	DPC common checker	1	
	AT30A5450AP	DPC checker cable	1	NOTE

(S—546 APH etc.)

DIGITAL PROGRAMMER CIRCUIT (NN-9509)

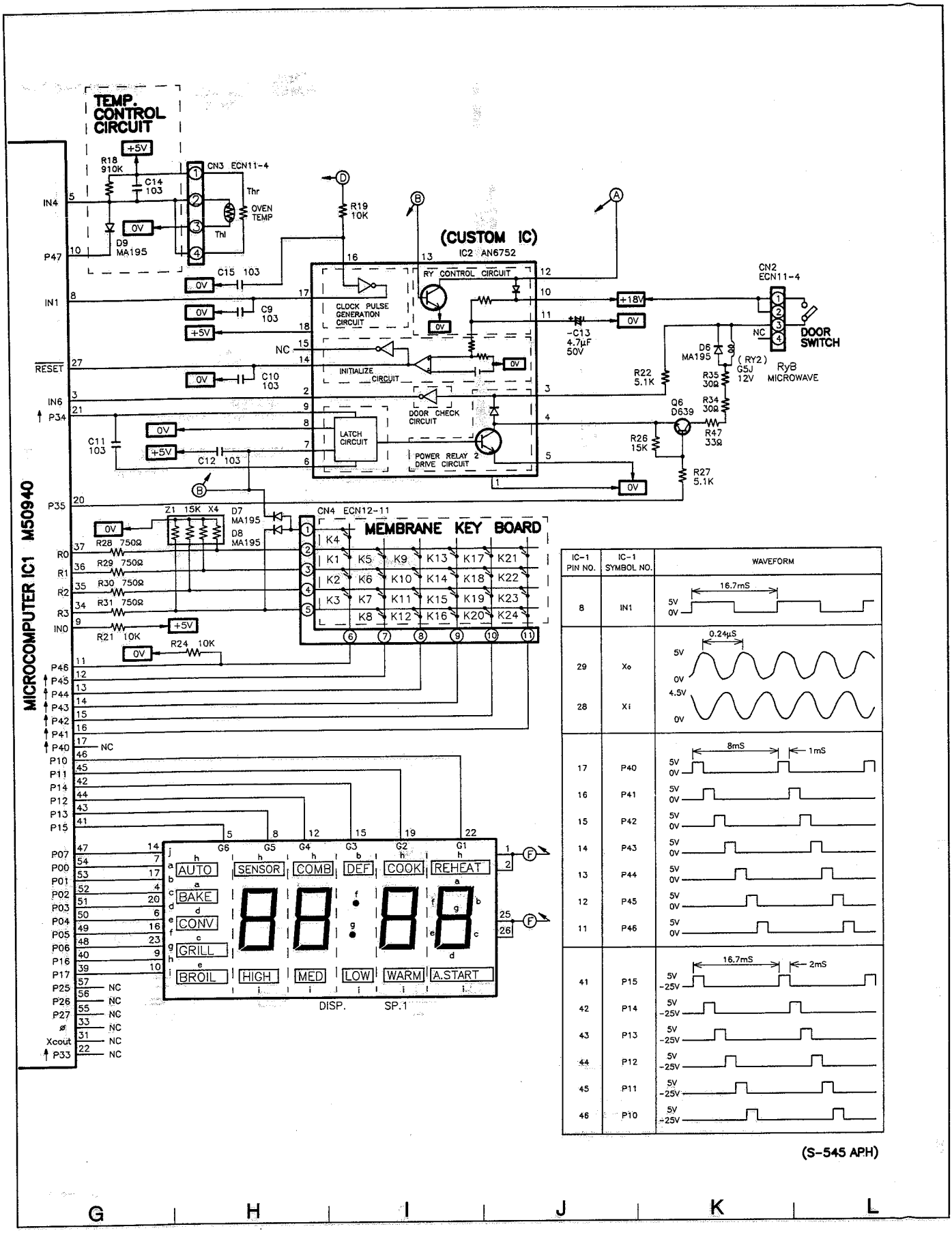
SCHEMATIC DIAGRAM



KEY MATRIX

K1	STOP/RESET	K5	A. W. COMBI	K9	1 SEC	K13	BROIL	K17	ROOM TEMP	K21	COOK	K25	
K2	1.0 LB	K6	A. W. DEFROST	K10	10 SEC	K14	BAKE	K18	REFRIG TEMP	K22		K26	
K3	0.1 LB	K7	A.START/ CLOCK	K11	1 MIN	K15	COMBI	K19	FROZEN TEMP	K23		K27	
K4	START	K8	STAND/TIMER	K12	10 MIN	K16	POWER	K20	LESS/MORE	K24		K28	

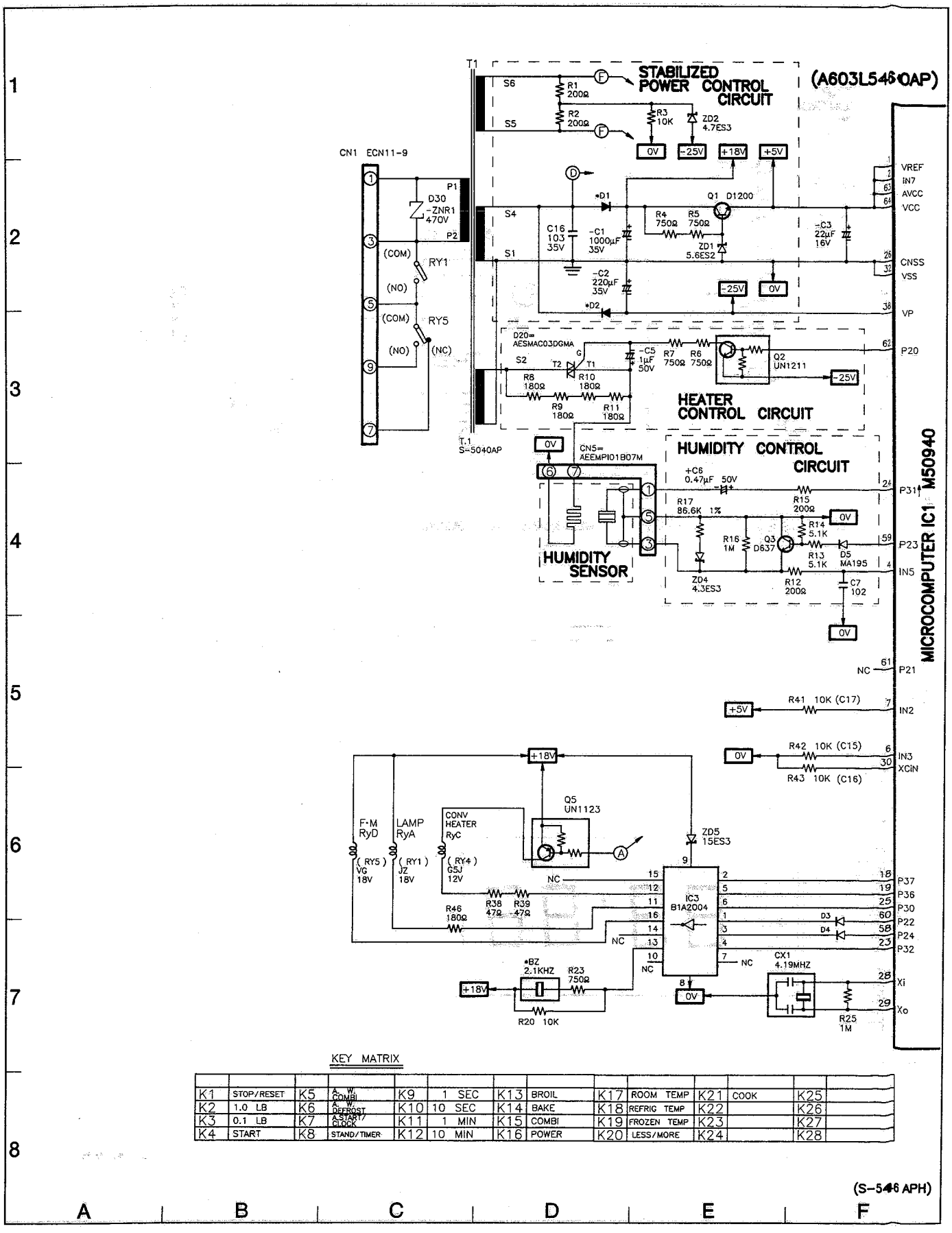
(S-545 APH)


TEMP. CONTROL CIRCUIT
MICROCOMPUTER IC1 M50940
(CUSTOM IC)
IC2 AN6752
MEMBRANE KEY BOARD
CN4 ECN12-11
CN2 ECN11-4
CN3 ECN11-4
DOOR SWITCH
RyB MICROWAVE
CLOCK PULSE GENERATION CIRCUIT
INITIALIZE CIRCUIT
LATCH CIRCUIT
DOOR CHECK CIRCUIT
POWER RELAY 2 DRIVE CIRCUIT
RY CONTROL CIRCUIT
AUTO
SENSOR
COMB
DEF
COOK
REHEAT
BAKE
CONV
GRILL
BROIL
HIGH
MED
LOW
WARM
A.START
DISP.
SP.1
IC-1 PIN NO.
IC-1 SYMBOL NO.
WAVEFORM
16.7mS
0.24μS
8mS
1mS
2mS

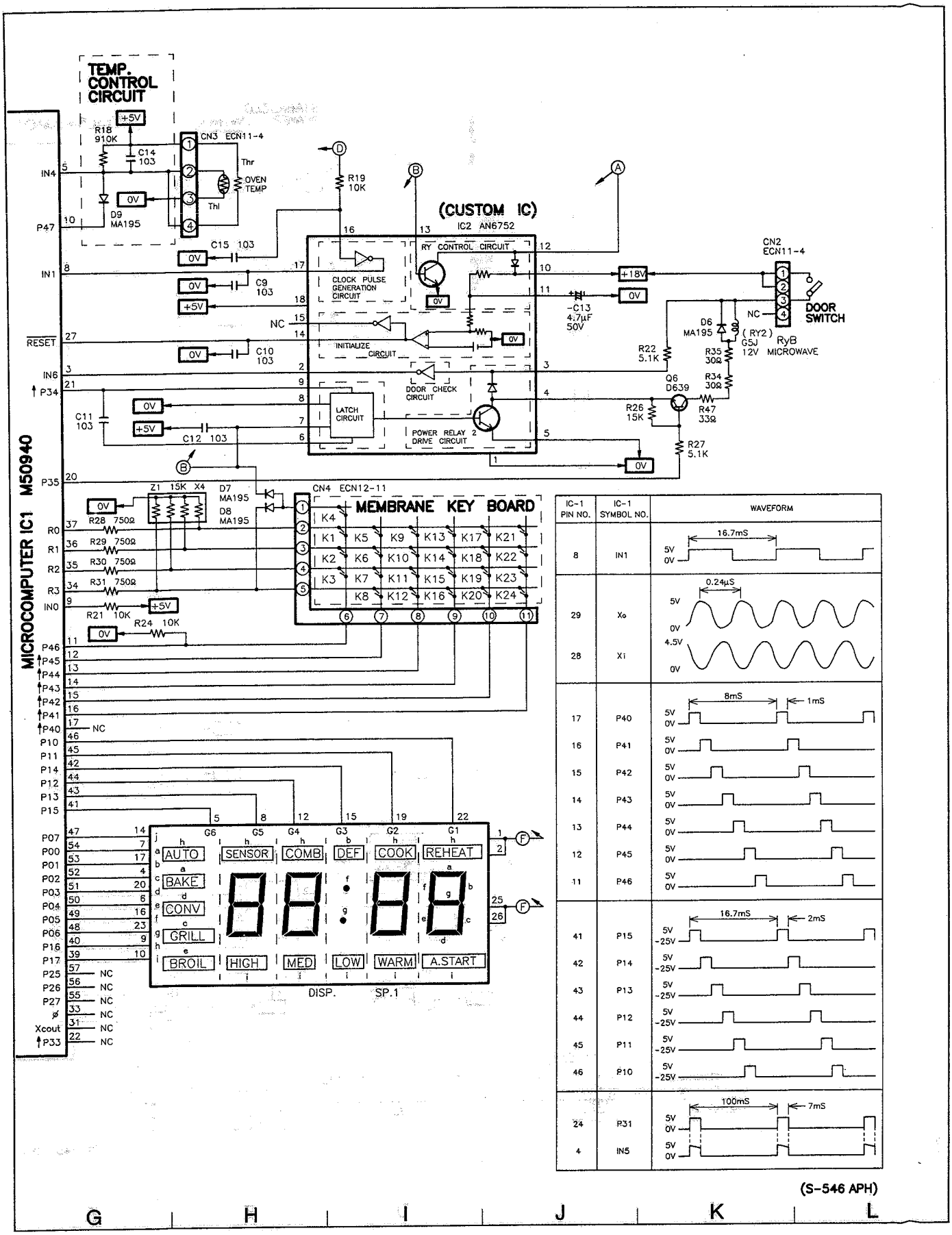
(S-545 APH)

DIGITAL PROGRAMMER CIRCUIT (NN-9809, NN-9859)

SCHEMATIC DIAGRAM

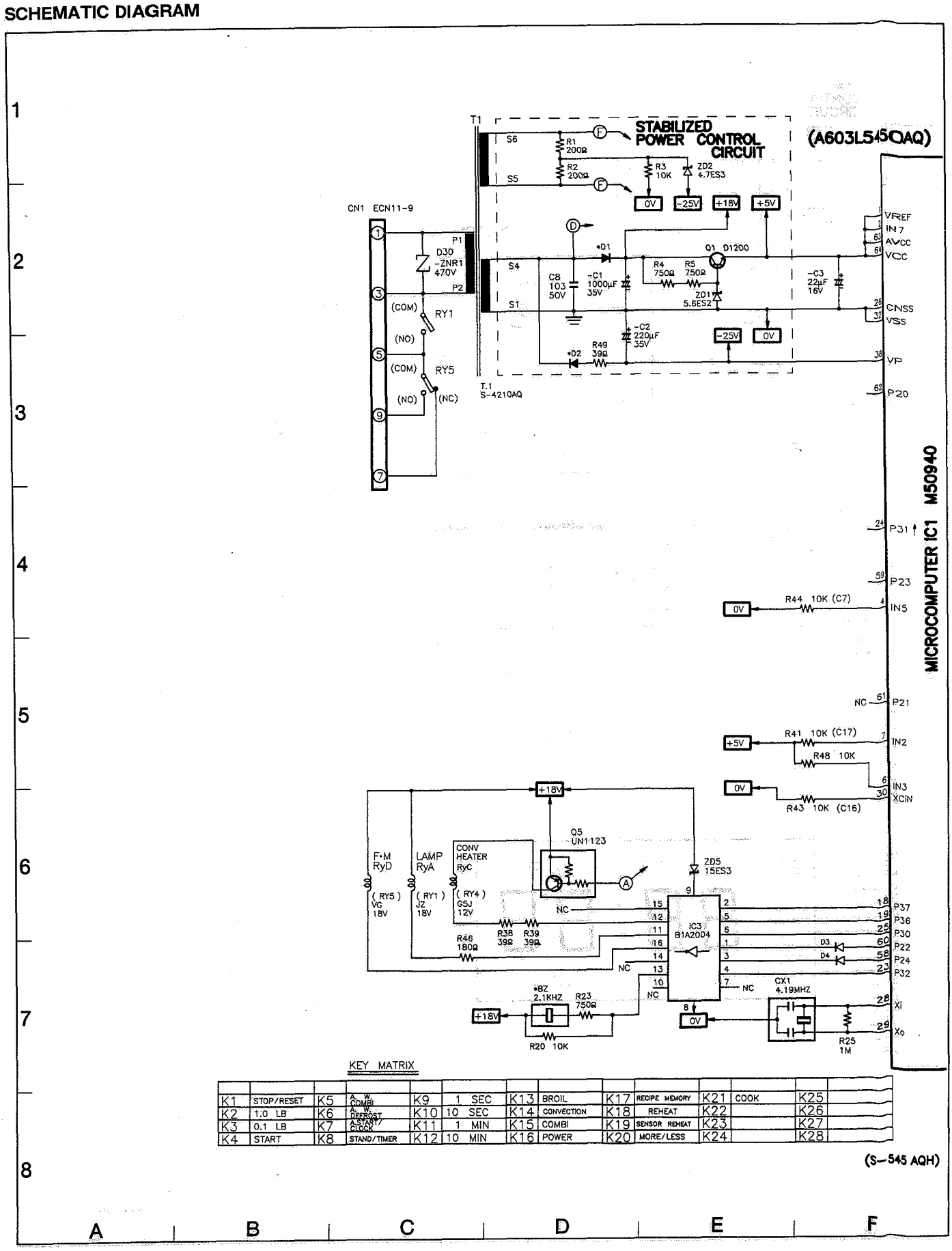


K1	STOP/RESET	K5	A. W. COMBI	K9	1 SEC	K13	BROIL	K17	ROOM TEMP	K21	COOK	K25	
K2	1.0 LB	K6	A. W. DEFROST	K10	10 SEC	K14	BAKE	K18	REFRIG TEMP	K22		K26	
K3	0.1 LB	K7	A.START/ CLOCK	K11	1 MIN	K15	COMBI	K19	FROZEN TEMP	K23		K27	
K4	START	K8	STAND/TIMER	K12	10 MIN	K16	POWER	K20	LESS/MORE	K24		K28	


TEMP. CONTROL CIRCUIT
MICROCOMPUTER IC1 M50940
(CUSTOM IC)
IC2 AN6752
CLOCK PULSE GENERATION CIRCUIT
INITIALIZE CIRCUIT
LATCH CIRCUIT
DOOR CHECK CIRCUIT
RY CONTROL CIRCUIT
POWER RELAY 2 DRIVE CIRCUIT
MEMBRANE KEY BOARD
DOOR SWITCH
MICROWAVE
AUTO
SENSOR
COMB
DEF
COOK
REHEAT
BAKE
CONV
GRILL
BROIL
HIGH
MED
LOW
WARM
A.START
DISP.
SP.1
IC-1 PIN NO.
IC-1 SYMBOL NO.
WAVEFORM
16.7mS
0.24μS
8mS
1mS
2mS
100mS
7mS
(S-546 APH)

DIGITAL PROGRAMMER CIRCUIT (MQ8869W)

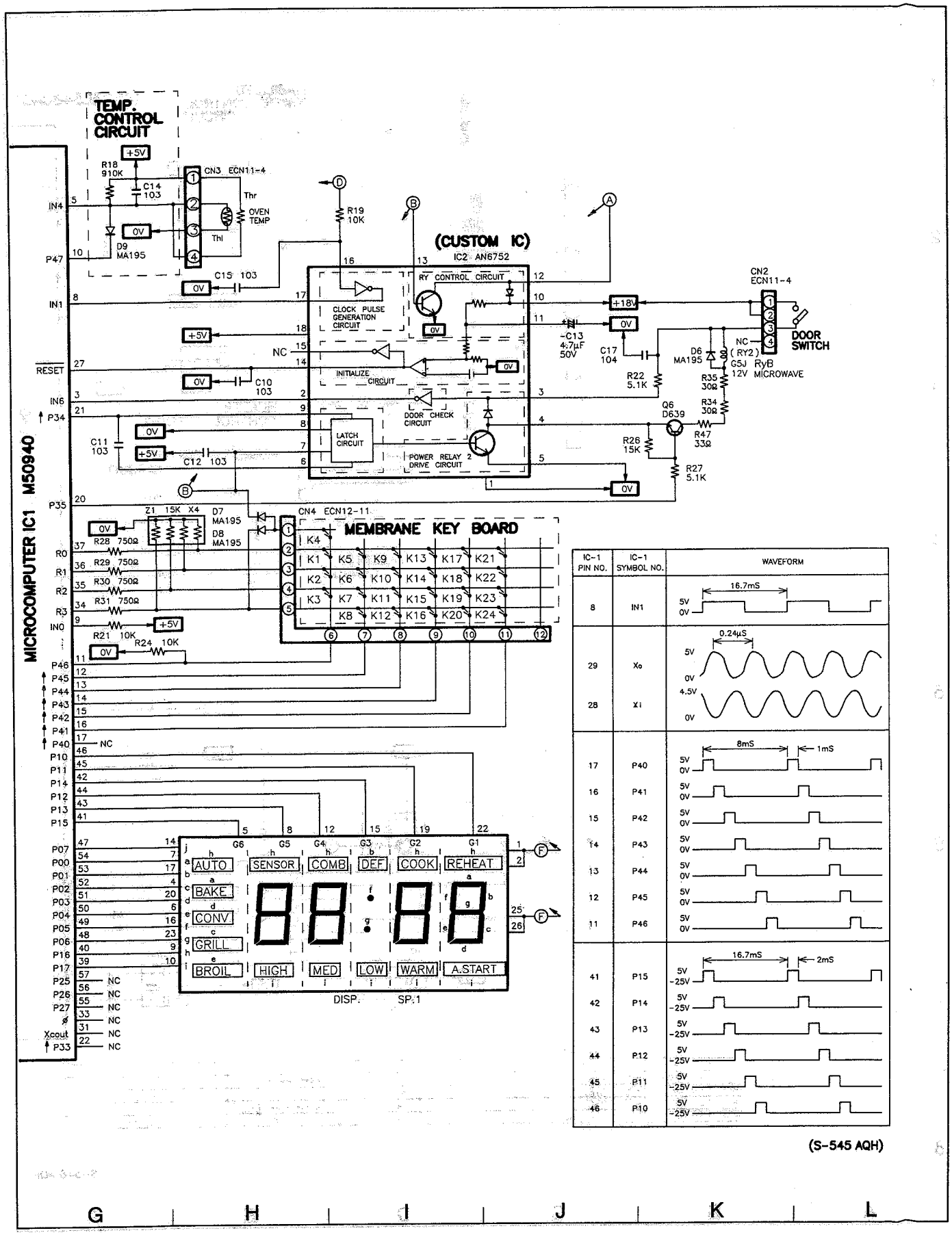
SCHEMATIC DIAGRAM



KEY MATRIX

K1	STOP/RESET	K5	A. W. COMBI	K9	1 SEC	K13	BROIL	K17	RECIPE MEMORY	K21	COOK	K25
K2	1.0 LB	K6	A. W. DEFROST	K10	10 SEC	K14	CONVECTION	K18	REHEAT	K22		K26
K3	0.1 LB	K7	A.START/ CLOCK	K11	1 MIN	K15	COMBI	K19	SENSOR REHEAT	K23		K27
K4	START	K8	STAND/TIMER	K12	10 MIN	K16	POWER	K20	MORE/LESS	K24		K28

(S-545 AQH)

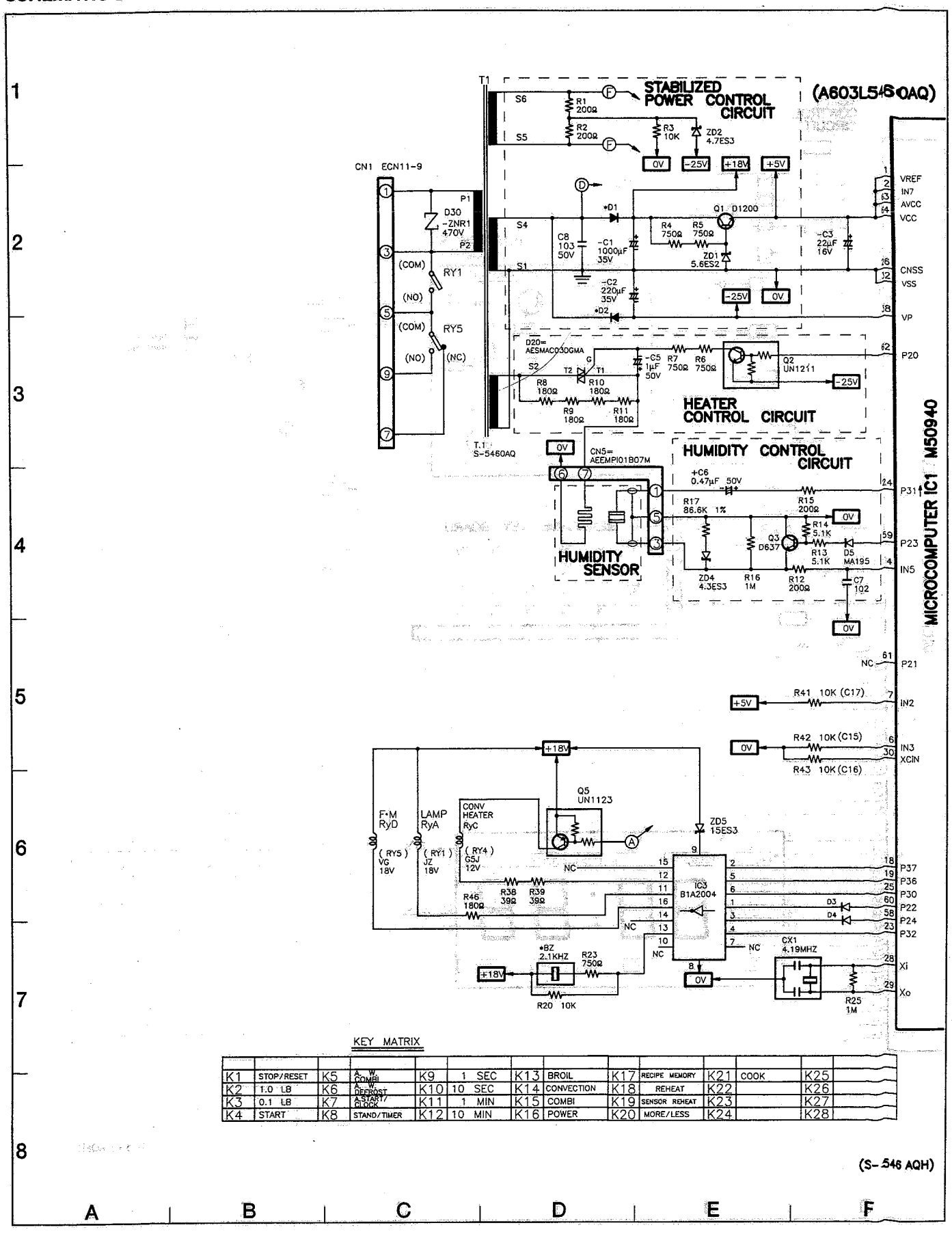


IC-1 PIN NO.	IC-1 SYMBOL NO.	WAVEFORM
8	IN1	16.7mS, 5V, 0V
29	Xo	0.24µS, 5V, 0V
28	Xi	4.5V, 0V
17	P40	8mS, 1mS, 5V, 0V
16	P41	5V, 0V
15	P42	5V, 0V
14	P43	5V, 0V
13	P44	5V, 0V
12	P45	5V, 0V
11	P46	5V, 0V
41	P15	16.7mS, 2mS, 5V, -25V
42	P14	5V, -25V
43	P13	5V, -25V
44	P12	5V, -25V
45	P11	5V, -25V
46	P10	5V, -25V

(S-545 AQH)

DIGITAL PROGRAMMER CIRCUIT (MQ8899W)

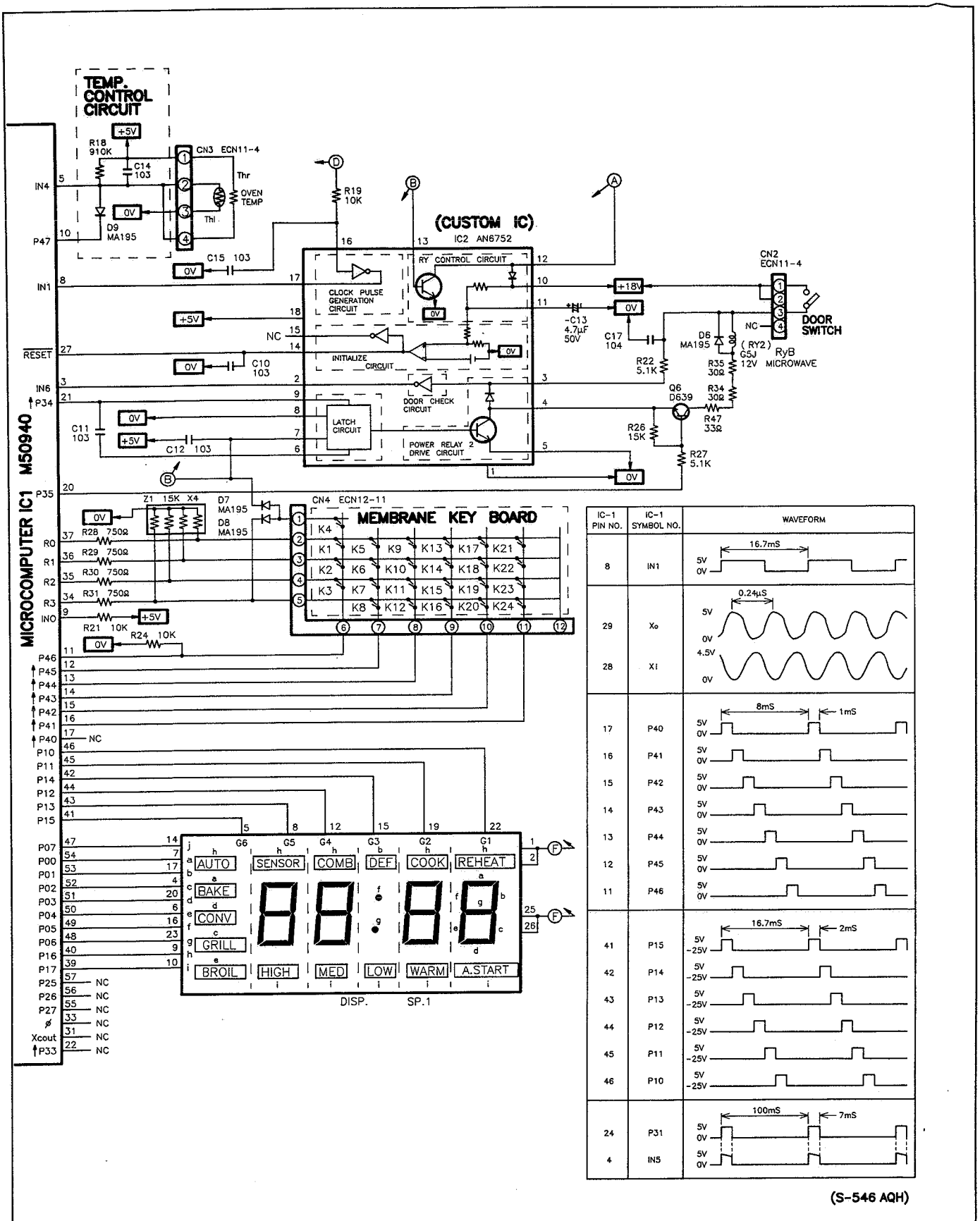
SCHEMATIC DIAGRAM



KEY MATRIX

K1	STOP/RESET	K5	A. W. COMBI	K9	1 SEC	K13	BROIL	K17	RECIPE MEMORY	K21	COOK	K25	
K2	1.0 LB	K6	A. W. DEFROST	K10	10 SEC	K14	CONVECTION	K18	REHEAT	K22		K26	
K3	0.1 LB	K7	A.START/ CLOCK	K11	1 MIN	K15	COMBI	K19	SENSOR REHEAT	K23		K27	
K4	START	K8	STAND/TIMER	K12	10 MIN	K16	POWER	K20	MORE/LESS	K24		K28	

(S-546 AQH)


TEMP. CONTROL CIRCUIT
MICROCOMPUTER IC1 M50940
(CUSTOM IC)
IC2 AN6752
CLOCK PULSE GENERATION CIRCUIT
INITIALIZE CIRCUIT
LATCH CIRCUIT
DOOR CHECK CIRCUIT
RY CONTROL CIRCUIT
POWER RELAY 2 DRIVE CIRCUIT
MEMBRANE KEY BOARD
DOOR SWITCH
RyB MICROWAVE
AUTO
SENSOR
COMB
DEF
COOK
REHEAT
BAKE
CONV
GRILL
BROIL
HIGH
MED
LOW
WARM
A.START
DISP.
SP.1
IC-1 PIN NO.
IC-1 SYMBOL NO.
WAVEFORM
16.7mS
0.24μS
8mS
1mS
2mS
100mS
7mS
(S-546 AQH)

MEMO